

Mysore Geological Department.

REPORT

OF THE

Chief Inspector of Mines

FOR THE YEAR

1913-14

With Statistics for the Calendar Year 1913



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REPORT

OF THE

CHIEF INSPECTOR OF MINES IN MYSORE

FOR THE YEAR 1913-14.

A.—LEASES AND LICENSES.

The following statements show the number of leases and licenses current at the close of the year 1913-14, as compared with the previous year:—

(1) MINING LEASES.

Mineral	District						1912-13	1913-14
1. Gold	Kolar	...	...	...	...	...	24	25
	Tumkur	...	...	...	...	...	2	2
	Mysore	...	...	...	...	...	12	12
	Kadur	...	...	...	...	...	1	1
2. Mica	Mysore	...	...	...	...	...	1	...
3. Manganese	Shimoga	...	...	...	...	...	...	2
Total						...	40	42
Increase						...	...	2

The mining lease for mica granted to the Bombay Mining Syndicate over a block of one square mile of land in the Seringapatam and Mandya Taluks having been surrendered, it has been removed from the list pending the issue of final orders of Government regarding its cancellation and the arrears of rent, etc., due by the lessees.

The Workington Iron and Steel Co., Ltd., obtained two mining leases, Nos. 141 and 142 for manganese for a period of 30 years from 18th July 1913 over two blocks of one square mile each in the Shimoga Taluk, Shimoga District, and a mining lease (No. 143) for gold was also granted to the Nundydroog Company over a block comprising 131.58 acres of land which originally formed part of the Tank Block in the Bowringpet Taluk, Kolar District.

(2) PROSPECTING LICENSES.

Mineral	District						1912-13	1913-14
1. Gold	Kolar	...	...	...	...	...	5	5
	Mysore	...	...	...	...	...	1	...
	Shimoga	...	...	...	...	...	3	5
	Kadur	...	...	...	...	...	12	4
Total						...	21	14

Prospecting Licenses.—*concl.*

Mineral	District				1912-13	1913-14
2. Copper ...	Mysore	...	...	...	...	1
	Chitaldrug	...	...	...	...	1
	Total				...	2
3. Manganese ...	Tumkur	...	...	...	5	...
	Shimoga	...	...	...	10	2
	Chitaldrug	...	...	...	3	1
	Total				18	3
4. Chrome ore ...	Mysore	...	...	...	3	7
	Hassan	...	...	...	1	2
	Total				4	9
5. Magnesite and chrome ...	Mysore	...	...	...	5	6
	Total				5	6
6. Mica ...	Mysore	...	...	...	4	2
	Hassan	...	...	...	2	1
	Chitaldrug	...	...	...	...	1
	Total				6	4
7. Mica and garnets ...	Kadur	...	...	...	2	...
	Total				2	...
8. Mica, cryolite, tantalite and columbite.	Mysore	...	...	...	...	2
	Total				...	2
9. Corundum ...	Kolar	...	...	...	1	...
	Total				1	...
10. Corundum and garnets ...	Kolar	...	...	...	1	1
	Total				1	1
11. Clay ...	Bangalore	...	...	...	2	1
	Total				2	1
12. Iron ore ...	Kadur	...	...	...	6	...
	Total				6	...
	Grand Total				66	42
Decrease				...	24	

District Abstract.

	1912-13	1913-14
Bangalore	2	1
Kolar	7	6
Tumkur	5	...
Mysore	13	18
Hassan	3	3
Shimoga	13	7
Kadur	20	4
Chitaldrug	3	3
Total	66	42

(3) COLLECTING LICENSES FOR CORUNDUM.

District			Taluk			1912-13	1913-14
1. Bangalore	...	...	Bangalore	...	...	1	1
			Dodballapur	...	...	1	1
			Nelamangala	...	...	1	1
			Magadi	...	...	1	...
2. Kolar	...	...	Goribidnur	...	...	1	...
			Sidlaghatta	...	...	1	1
			Bagepalli	...	...	1	1
			Srinivasapur	...	...	1	...
			Bowringpet	...	...	1	1
3. Tumkur	...	...	Tumkur	...	...	1	1
			Koratagere	...	...	1	1
			Maddagiri	...	...	1	1
			Pavagada	...	...	1	1
			Sira	...	...	1	...
			Kunigal	...	...	1	1
			Gubbi	...	...	...	1
			Tiptur	...	...	...	1
			Chiknayakanhalli	...	...	1	...
4. Mysore	...	...	Mysore	...	...	1	1
			Nagamangala	...	...	1	1
			T.-Narsipur	...	...	1	1
			Chamrajnagar	...	...	1	1
			Hunsur	...	...	1	1
			Heggaddevankote	...	...	1	1
			Mandya	...	...	1	...
			Malvalli	...	...	1	...
			Seringapatam	...	...	...	1
			Nanjangud	...	...	...	1
5. Hassan	...	...	Channarayana	...	...	1	1
			Arsikere	...	...	1	...
			Belur	...	...	1	1
			Manjarabad	...	...	1	...
6. Kadur	...	...	Kadur	...	...	1	...
7. Chitaldrug	...	...	Challakere (part)	...	...	1	1
			Hiriyur	...	...	...	1
			Total	...	...	30	25

(4) EXPLORING LICENSES.

District			1912-13	1913-14
Kolar	...	...	3	1
Tumkur	...	...	1	1
Mysore	...	...	4	2
Hassan	...	...	7	3
Kadur	...	...	2	4
Shimoga	...	...	...	3
Chitaldrug	...	...	2	4
Total			19	18

Summary.

The total number of leases and licenses that were current at the close of the year under report as compared with the total number current at the end of 1912-13 is:—

			1912-13	1913-14
Mining leases	...	...	40	42
Prospecting licenses	...	...	66	42
Exploring licenses	...	...	19	18
Collecting licenses	...	...	30	25
Total			155	127

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B.—GOLD MINING.

I.—Gold Production, Dividends and Royalty for the calendar year 1913.

The nominal capital of all the Companies carrying on operations in Mysore was—

	£.	s.	d.
in December 1913	1,566,000	0	0
and in December 1912	1,566,000	0	0

or the same for both the years.

The amount of the above capital called and paid up was—

	£.	s.	d.
in December 1913	1,516,772	0	0
and in December 1912	1,516,772	0	0

or the same for both the years.

The number of Companies (1) which carried on operations, (2) which paid dividends and (3) which produced gold, but paid no dividends, during the year was in each case the same as for the year 1912, viz., 5, 4 and 1 respectively.

	£.	s.	d.
The total value of bullion produced—			
during 1913 amounted to	2,150,193	11	10
and during 1912	2,158,361	18	10

being a decrease of ... 8,168 7 0

or a decrease of 0·37 per cent, as against an increase of 1·34 per cent in 1912.

	£.	s.	d.
The total amount paid in dividends—			
during 1913 was	739,550	18	0
and during 1912	749,398	5	4

being a decrease of ... 9,847 7 4

or a decrease of 1·31 per cent as against a decrease of 3·19 per cent in 1912.

The total dividends paid during the year amounted to 61·18 per cent of the paid-up capital of the dividend paying Companies or to 48·76 per cent of the paid-up capital of all the working Companies. The corresponding figures for 1912 were, respectively, 61·99 per cent and 49·41 per cent.

	£.	s.	d.
The royalty due to Government on the gold won—			
during the year 1913 was	126,219	10	9
as against in 1912	126,653	1	1

being a decrease of ... 433 10 4

the decrease being 0·34 per cent, as against an increase of 1·43 per cent in 1912.

II.—Total Gold Production, Dividends and Royalty from 1882 to the end of 1913.

The total value of gold bullion produced from the commencement of mining operations is—

	£.	s.	d.
up to the end of 1912	38,144,164	0	9
and for 1913	2,150,193	11	10
Grand Total	40,294,357	12	7

The total dividends paid—

	£.	s.	d.
up to the end of 1912	15,188,881	17	0
and for 1913	739,550	18	0
Grand Total	15,928,432	15	0

The total amount of royalty which has been paid to Government is—

	£.	s.	d.
up to the end of 1912	1,941,732	10	0
and for 1913	126,219	10	9
Grand Total	2,067,952	0	9

III.—Gold Production for the six months ending June 30th, 1914.

NAME OF MINE			Fine Ozs.	£ Stg.	Fine Ozs.	£ Stg.
Mysore Mine	...	{ Mill ...	93,774	398,539·50	-	
	...	{ Cyanide ...	11,757	49,967·25		
		Total ...				
Champion Reef Mine	...	{ Mill ...	48,916	207,893·00	105,531	448,506·75
	...	{ Cyanide ...	13,226	56,210·50		
		Total ...				
Ooregum Mine	...	{ Mill ...	31,489	133,828·25	62,142	264,103·50
	...	{ Cyanide ...	9,634	40,944·50		
		Total ...				
Nundydroog Mine	...	{ Mill ...	32,713	139,030·25	41,123	174,772·75
	...	{ Cyanide ...	2,856	12,138·00		
		Total ...				
Balaghat Mine	...	{ Mill ...	6,204	26,367·00	35,569	151,168·25
	...	{ Cyanide ...	1,362	5,788·50		
		Total ...				
Gross Total ...					7,566	32,155·50
					251,931	1,070,706·75

IV.—Number of Mines at work.

Mining operations were in progress on 15 mining and prospecting blocks during the year 1913-14 as against 16 during the previous year work having ceased on the Shiddarhalli Mine. These 15 blocks are distributed as follows:—

Kolar Gold Fields.

1. Mysore Block (Mining Leases Nos. 127, 128 and 134). The Mysore Gold Mining Company, Ltd.
2. Champion Reef Block (Mining Leases Nos. 121 and 136). The Champion Reef Gold Mining Company of India, Ltd.
3. Ooregum Block (Mining Leases Nos. 132 and 137). The Ooregum Gold Mining Company of India, Ltd.
4. Nundydroog Block (Mining Leases Nos. 131, 135, 138, 139, 140 and 143). The Nundydroog Company, Ltd.
5. Balaghat Block (Mining Lease No. 120). The Balaghat Gold Mining Company, Ltd.
6. New Kempinkote South Block (Mining Lease No. 129). The New Kempinkote Gold Field, Ltd.
7. New Kempinkote Block (Mining Lease No. 130). The New Kempinkote Gold Field, Ltd.
8. Ahmed's Block (Mining Lease No. 111). Messrs. Jahgirdar Mohamed Abdur Rahim Sahib and Khajee Mohamed Ibrahim Sahib, Gosha Mahal, Hyderabad (Deccan).
9. East Betarayaswami Block (Mining Lease No. 118). Messrs. Paul Knight and Robert Knight.—(under option) to East Betarayaswami, Ltd.

Shimoga District.

10. Kudrikonda Block (Prospecting License No. 405). Eastern Development Corporation, Ltd.
11. Kodikoppa Block (Prospecting License No. 361). Mr. D. Shama Rao.
12. Palavanhalli A Block (Prospecting License No. 399). The Gold Fields of Mysore and General Exploration, Ltd.
13. Palavanhalli B Block (Prospecting License No. 400). The Gold Fields of Mysore and General Exploration, Ltd.

Kadur District.

14. Jalagargundi Block (Prospecting License No. 340). The New Shimoga Gold Fields, Ltd.

Mysore District.

15. Woolagiri Block (Mining Lease No. 133). The Nanjangud Gold Fields, Ltd.

Of the above only the first five mines on the Kolar Field were gold producers.

V. Progress Notes from Mines.**(a) Kolar District.***Mysore Mine.*

This mine had a record year in 1913; more quartz was crushed, tailings and slimes treated and gold won than in any previous year since its formation; the dividends were maintained at the same rate as in 1912.

The ore reserves showed an increase of 39,104 tons, the figure standing at 1,377,102 tons. A further sum of £25,000 was added to the Reserve Fund making the total £150,000.

Compared with former years, the developments in the bottom workings of Ribblesdale's Section have not been satisfactory of late. This is the main section of the mine and for some time past a large amount of driving and sinking has been done without disclosing anything of the nature of a valuable ore-shoot. The quartz continues, but it has been low in value. This state of affairs reminds one of the extensive zone of poor ore which was passed through some years ago at a higher level and which was succeeded by several valuable shoots. An improvement may reasonably be hoped for as the schists may be expected to continue to a much greater depth. Owing to the moderate dip of the veins in the Mysore Mine the bottom workings are not nearly so deep (vertically) as those of Champion Reef and Ooregum where good ore continues to be opened up.

No sinking was done in Edgar's Shaft, but work was continued in making excavations at the 8th level for the necessary engines, etc., in connection therewith.

Good progress was made with the sinking of McTaggart's Vertical Shaft; by the end of June it had reached a total depth of 1,136 feet of which 1,086 feet were bricked.

The Slimes Plant, to which reference was made last year, is now in course of erection and will probably be in operation by the end of 1914.

Arrangements are in hand for filling the stopes in Tennant's Section by means of waste rock sent down from surface. For this purpose a shoot to connect with Hancock's Shaft at a depth of 58 feet was sunk, and a railway from the dump near Crocker's Shaft is in course of construction.

Mysore Southern Extension.

Work was carried on for the Syndicate by the Mysore Mine at two points, *viz.*,—2,160 and 2,385 foot levels, both extensions of drivages south from McTaggart's Shaft of the above mine.

The 2,160 foot level was extended 464 feet. The lode, for a length of 284 feet, varied from 6 inches to 4 feet in width and in assay value from a trace to 9 dwts. The total length of the drilage was 477 feet at the 30th June, the end being in country rock.

The 2,385 foot level was driven 170 feet. The end being in barren ground, after passing through quartz averaging 13 inches in width assaying $4\frac{1}{2}$ dwts. for a length of 81 feet, driving was temporarily suspended. A crosscut east was put out for a distance of $38\frac{1}{2}$ feet from the end but nothing was met with. Likewise at a point 114 feet from the beginning of the level a cross cut west was driven $72\frac{1}{2}$ feet but without making any discovery.

Champion Reef Mine.

This mine has maintained its position, the record for the past year being an excellent one. The gold returns were better and the profits exceeded those of the previous year in face of an increase in the costs; the latter can be partly accounted for by the larger quantity of slimes treated.

The comparatively slight increase in the ore reserves is due to the fact that certain blocks estimated as containing over 46,000 tons of low grade ore have been omitted; these have been left to reduce the risk of air blasts in the stoping area with very beneficial results up to date.

The following comparative table speaks for itself:—

	1913-14	1912-13	1911-12
Number of air blasts	... 290	475	331
Number resulting in damage	... 5.5%	8.2%	12.4%

The number of shocks recorded as "very heavy" was only 20 as compared with 97 in the previous official year. No very serious damage was done, nor was the working of the mine affected to any appreciable extent.

Circular shaft.—Sinking and bricking have now been completed, the total vertical depth of the shaft being 3,861 feet or 30 feet below the 42nd level. The main loading station will be at the 41st level and the principal station for landing persons at the 42nd level. From below the 40th level ore will be raised by large, specially designed air-hoists, through secondary shafts which are being sunk.

The equipment of this shaft was started in January last working upwards from the bottom and, by the end of June, the byatts and rails had been brought up a total distance of 1,368 feet, leaving approximately 2,500 feet still to be done. The surface plant is practically completed.

Filling and packing.—The system of filling worked out, stopes has been extended and accelerated, waste rock being lowered from the surface for this purpose in addition to that sorted out underground.

Ventilation.—Special attention continues to be given to ventilation. Some interesting figures in regard to temperatures are supplied by the mine from which the following are taken:—

Circular Shaft, 41st crosscut, the variation was 1° between 12 noon and 12 midnight, i.e., from 86° to 87° F.

Carmichael's Shaft, 41st plat between 12 and 1 p.m. 90° to 92° F.

Do 46th plat between 12 and 1 p.m. 94° to 95° F.

Do near the top, between 12 and 2 p.m. 83° F.

Garland's Shaft, near the top, between 12 and 2 p.m. 83° to 84° F.

The observations taken cover a period of 30 days (June 1914); the Circular Shaft is downcast and the other two upcast. The immense volume of fresh air which now reaches the lower workings through the New Circular Shaft has very materially improved conditions of work.

Ore-treatment.—A Tube Mill Plant for re-grinding the coarser products from the Mill has been erected and will start work in September next. The tailings from the Mill are elevated by air lifts to a series of cone classifiers. In these the tailings are separated into three grades the finer portion going to the Cyanide and Slime Plants, while the coarser material passes to the Tube Mills, of which there are three. They are there reground and passed over plates for amalgamation. The tailings again pass to the cones for separation and thence to the Cyanide and Slimes Plants.

A Concentration Plant for separating the coarser and richer portion from the sand of the old tailings dumps is also in course of construction. The Concentrates will be sent to the Tube Mills for regrinding and subsequent treatment.

Air compressing plant.—A mixed pressure Steam Turbo Air Compressor of 412 H.P. has been erected and put to work. This machine, which is the first of its kind in India, utilizes the exhaust steam from the 2,000 H.P. winding engine—at Carmichael's Shaft. When the winding engine is idle and exhaust steam is not available, it is run by live steam from the same boilers that supply the winding engine, the change being effected automatically. The plant delivers 25,000 cubic feet of free air, compressed to 60 lbs., per minute and by utilizing the otherwise waste exhaust steam the cost of compression compares favourably with that of electrically driven compressors.

A new Rotary Compressor of 585 H.P. is on order to augment the compressing plant as the demand for air is a constantly increasing one. The air is now largely used for ventilating the working faces as well as for driving the machines underground.

Ooregum Mine.

As a result of the improvement in the underground developments last year, the output of gold for 1913 was the largest in the history of the Company; there was also a slight increase in the ore reserves which were estimated at 187,000 tons.

All three sections of the mine are continuing to open up well and it is gratifying to note that the discovery recorded last year south of the dyke in Taylor's Section is holding on, quartz of good value having been met with in the 44th, 46th and 47th levels. A crosscourse interfered with and displaced the lode in both Oakley's and Bullen's Sections at the 46th level, but below this payable ore has again been encountered, the bottom level of the mine being in rich quartz.

Future mine development.—Oakley's Incline Shaft has now reached the 53rd level making a total length of 3,200 feet, this being the full depth for which the engine at the 21st level was designed; sinking will be suspended and a vertical shaft which it is proposed to sink to a depth of 3,000 feet commenced at the 52nd level. This shaft will be fitted with double skip-roads and double cage-roads and chambers will be cut to accommodate winding engines for raising and lowering persons and hoisting stuff.

Taylor's Main Winze, which is now 1,000 feet in depth has also been suspended and a vertical shaft is being started at the 52nd level. This is a small shaft to help with the development and the ventilation of Oakley's Section.

Ventilation.—In view of the great depth reached by the underground workings and consequent increase in temperature special attention has been paid to this subject with beneficial results.

A 50" electrically driven Sirocco fan was installed at the top of Taylor's Vertical Shaft at the 32nd level; this has improved the ventilation in the main thoroughfares to the 50th level. The three 25" air-operated fans which are working at different places in the mine have given such good result that it has now been decided to instal a 100 H.P. Motor and fan at the top of Bullen's Shaft (surface) and a 50 H.P. Motor and fan at the top of Bullen's Incline at the 40th level to force fresh air into the workings. These fans will not only ventilate the lower levels, but will also help the stopes between the 30th and 38th levels, which have become very hot since Taylor's Vertical was walled off to draw the hot air from the bottom of the mine.

A large electrically operated "Ozonair" set is on order which it is proposed to fix at the 52nd level, Oakley's Section; from this it is hoped to get increased efficiency by purifying the air.

Ice to the extent of 100 lbs. is being sent down daily to cool the drinking water at the 52nd level, Oakley's Shaft; this is much appreciated by the men working there and in the bottom levels.

Ore treatment plant.—Good progress has been made with the reorganization of the above plant and it is hoped that the Tube Mills and Vacuum Plants will be started before the end of the year.

It has recently been decided to go in for a Retreatment Plant; by this means a considerable profit should be obtained from retreating the cyanide tailings of which there are over a million tons in stock.

Nundydroog Mine.

There was a reduction in the output of gold compared with the previous 12 months, but this can be accounted for chiefly by the fact that nearly 10,000 tons less of quartz were crushed, following the policy instituted of temporarily restricting the monthly crushings owing to poorer developments in the bottom levels.

A fair measure of success has attended the latter and it is hoped to be able to maintain the returns at their present level, but much depends on the ore-bodies encountered in the bottom workings showing no further diminution in width, the tendency being unfortunately in that direction at present.

Circular shaft.—This was marked out some 3,000 feet west of Kennedy's Shaft and started in the middle of April; by the end of the following month it had reached a depth of 32 feet. No sinking was done in June, owing to the requisite equipment for continuing the same being put in hand. It is proposed to take it down to a vertical depth of 4,000 feet.

The house and loadings for the new electrical hoist at the Oriental Shaft are nearing completion. This engine will handle 2 tons of stuff in self-dumping skips from the 4,000 feet level at a maximum speed of 1,875 feet per minute.

The erection of the Slimes Plant, which will eventually handle some 400 tons of slime per day, is well forward and should come into service in a few months' time. The reorganization of the Percolation Plant will then be taken in hand; later Tube Mills will be erected for the regrinding of the current ore plus the old tailings; the whole plant should be running in 18 months' time.

Balaghat Mine.

Exploratory operations have been vigorously pursued during the past 12 months and excellent progress made in extending some of the lower drivages. From the end south at the 3,175 foot level, Ogle's Main Winze, a crosscut east, after being driven some 70 feet, intersected a reef which has varied both in width and value. At the end of June, this reef was 4 feet wide and well-defined carrying stringers of low grade quartz. A winze sunk below this level also followed a well-defined reef with occasional good assays; driving will shortly be commenced at the 3,300 foot level.

In view of the above discovery, the prospects in this part of the mine are considered to be brighter than they have been for some years past. The west reef has continued to open up a certain amount of good stopping ground in the upper levels.

The exploratory work carried out at the northern end of the mine has up to present met with no success.

East Betarayaswami, Ltd.

An option has been acquired by the above Company for a period of two years under agreement with the Proprietors of the East Betarayaswami Mine.

Operations were accordingly restarted in March 1914 and the water pumped out of the mine. The underground and surface works were put in order and the No. 1-shaft partly retimbered.

Work is at present confined to sinking this shaft and the No. 1 winze north. The former has now reached a depth of 49 feet below the 150 foot level and the latter 136 feet, 6 inches below the same level. In the winze a well-defined lode has been followed, assays up to 15 dwts. having been obtained. At present the quartz averages 2 feet, 3 inches in width with an assay value of 3 dwts. Both these points are being worked by hand labour and as there is a good deal of water to contend with, progress is naturally slow.

The scheme in hand is to sink both the shaft and the winze to a depth of 300 feet below surface, drive north and south on the reef from the bottom of the latter and communicate by means of a crosscut to the shaft for ventilation and hoisting.

Ahmed's Block.

All work on this block was suspended in July 1913, pending the result of the litigation between the lessees regarding certain rights. The water has risen to within 12 feet of the top of the new shaft referred to in last year's report.

(b) Mysore District.

The work undertaken last year at the Woolagiri Mine was brought to a close in August 1913 as the developments were not sufficiently encouraging to warrant further expenditure.

(c) Kadur District.

Work at the Shiddarhalli Mine has been suspended owing to want of funds. The country is very disturbed and the distribution of gold very erratic and not sufficiently encouraging to warrant further expenditure at present. Operations on the Nandi Hcshalli Block have been abandoned as the work failed to disclose anything of value. The Jalagargundi Mine was sampled during the previous year on behalf of one of the Kolar Companies, but the results were not considered to be sufficiently good to warrant further action. The licensees were not however satisfied with the results of the investigation and during the year under report a large sample was taken from the 200 foot level at No. 2 shaft. The work consisted in stoping out a length of 150 feet of the east drive for a height of 5 feet. The amount of ore broken out was 260 tons and the whole was sorted and graded. A sample of all the ore broken gave an average of 10 dwts. 6 grains per ton and if the white footwall quartz is picked out the balance, amounting to 69 per cent, gives an average of nearly 14 dwts. The results of the test are encouraging and it is hoped that funds will be forthcoming to carry on further work.

(d) Shimoga District.

A good deal of prospecting work has been carried out on several licenses in the neighbourhood of Kudrikonda, Palavanhalli and the old Honnali Gold Field. Many of the outcrops show small quantities of gold but the amount is usually negligible at a few feet from surface. In one case however a small reef, varying from 6 inches to 3½ feet in width, yielded a number of samples assaying several ounces to the ton. Two samples taken by the department gave respectively 10 dwts. and 4 ozs. 8½ dwts. Outcrops have been traced from about 400 feet, but it is doubtful if they are continuous and as the best portions lie in a wet nulla where pumping machinery would be required it has been decided to defer sinking operations for the present. The exposure probably belongs to the series of small rich lenses many of which have been found and tested in various parts of this district but none of which have so far proved to be sufficiently continuous or connected to be worth working.

A large number of washings have been made which show that gold is widely distributed, but want of water is against the probability of any profitable work being undertaken. Systematic efforts are being made to trace the gold towards its point of origin by careful examination of the character of the alluvial grains and this work is still in progress.

(e) Alluvial Washings.

A number of samples of alluvial materials have been taken from time to time by officers of the department during survey work and these indicate that the detrital materials derived from certain of the Shimoga schists contain small quantities of gold. Prospecting work in the neighbourhood of Saulonga has shown that in some places the washings may go as high as a few dwts. to the ton though the average over any workable area is very much less. Whatever prospects there might be of finding deposits of workable grade in that locality are practically eliminated by the lack of the necessary water for washing on a large scale. Under these circumstances, it was considered very desirable to make an extended examination of the alluvium in the neighbourhood of the Tungabhadra river which cuts across these particular schists between Shimoga and Honnali.

An extensive series of washings were undertaken along and near the river, the samples which vary from 1 to 6 tons in weight being washed in a cradle constructed for the purpose. The results of these large samples have been most disappointing in spite of the practically universal presence of gold, sometimes of fair grade, shown by ordinary panning. An average

of all the tests made gives a result which does not exceed 1 grain per cubic yard and the best result obtained was only $3\frac{1}{2}$ grains per cubic yard. These results are too low to hold out any prospect of profitable working. In the case of the $3\frac{1}{2}$ grains test, the results would be worth following up if the character of the deposit was favourable, but unfortunately this is not the case as the gold occurs in a hard gravel about 1 foot thick fringing the bed of the river and if it extends laterally beneath the river bank some 10 feet or so of hard clay overburden would have to be removed to get at it. Under these circumstances, the prospects of work on a large scale cannot be regarded as encouraging, though it is difficult to understand why the gold should not occur in more highly concentrated patches of workable extent.

VI.—Electric Power Supply.

(a) Cauvery System.

Work has been carried on, uninterruptedly, throughout the year on the Kannambadi Dam for the Cauvery Reservoir. Progress has been rather slower than was anticipated owing to the necessity of carrying the foundations on either bank somewhat deeper than was originally estimated. The foundations have now been completed across the whole of the river bed and for some distance on both banks and the masonry has been raised somewhat above river level. Work is at present proceeding on the erection of the large central sluices. It is hoped that it will be possible to store a certain amount of water by the end of 1915.

During the current year there was a considerable shortage of water at the Sivasamudram Generating Station between the middle of March and the end of June and this involved serious curtailment of the Power Supply to the Kolar Field.

Development work on the Field was accordingly hindered and much reduced but the mills were kept supplied and the output of gold was not materially affected.

(b) Kolar Mines Power Station.

The following notes have been kindly furnished by Mr. F. M. Nicholl, Chief Electrical Engineer.

Seventy Motors were connected to the distribution system of this Station at the 30th June, aggregating 2,042 H.P. driving intermittent loads, and thirteen Motors, aggregating 3,267½ H.P. operating Winding Engines and Hoists, giving a total of 83 Motors for all purposes aggregating 5,309½ H.P.

The following were the numbers of the Board of Trade Units sold for the various purposes :—

Intermittent Power.	Hoisting.	Lighting.
22,90,449	19,52,810	7,08,060
Total Units sold	...	49,51,319

The amount of power sold during the twelve months under review was 3·45 per cent greater than the amount sold during the preceding year.

The present rates charged for the supply of current are as follows :—

Intermittent and Hoisting	...	1½d. per unit.
Lighting	...	3d. per unit.

The average price charged for all classes of supply during the year was 1·5033d. per unit.

About the middle of March the level of the water in the Cauvery River at Sivasamudram commenced to fall and from that time until the end of June there was a considerable shortage in the supply of power. When towards the end of April the supply fell to below 2,000 H.P., the Reserve Steam Plant in the Kolar Mines Power Station was placed in operation and utilized to maintain the electric hoisting service until the last week in May, when an appreciable increase took place in the supply of power from the Cauvery System.

At the 30th June last, 69 motors, aggregating 8,916 H.P., were connected to the Cauvery system.

**C.—MANGANESE, CHROME ORE, MAGNESITE, IRON ORE, MICA,
COPPER, ASBESTOS AND CORUNDUM.**

I. MANGANESE.

Manganese mining was very slack during the year and operations were carried on only on 3 blocks as against 7 in the previous year. The total quantity of ore mined during 1913-14 was 13,944 tons and the quantity exported 5,253 tons. The royalty paid was Rs. 1,461-8-0.

The corresponding figures for the previous year were:—

Ore mined	...	...	...	...	23,332 tons
Ore exported	...	...	...	...	36,877 „
Royalty	...	...	...	...	Rs. 16,448-12-0

The following statement shows the quantities collected and sold during 1913 and the first six months of 1914:—

NAME OF LESSEE OR LICENSEE	Capital	1912 Long tons		1913 Long tons		1914 January to June Long tons		Blocks worked Nos. of licenses
		Collected	Sold	Collected	Sold	Col- lected	Sold	
1. The Workington Iron and Steel Co., Ltd. ...	£150,000	23,380	22,511	10,470	23,742	8,808	214	1 & 2
2. Mr. A. Voigt ...	.....	1,419	1,268	...	256	...	...	116
3. Mr. C. Jambon ...	.....	130	...	31	...	150	...	153
Total ...	.....	24,929	23,779	10,501	23,998	8,958	214	

Work was confined to the Kumsi and Shankargudda properties of the Workington Company. Holmes Block and Python Block at Kumsi have continued to open up satisfactorily. A deep cutting has now been carried through the former from the lower tram line level which will enable a larger quantity of ore to be excavated and handled and the Python Block has been connected by a tram line of about a mile in length with Holmes Block. The discoveries at Shankargudda which were referred to last year continue to show good developments and a large quantity of ore awaits transport. The Company have applied for permission to construct a tram line from here to Shirgere, but sanction for this has not been obtained and until the line is constructed there is no hope of getting away any considerable part of the output.

II. CHROME ORE.

There has been some renewed activity in connection with this mineral and 15 licenses were current at the close of the year as against 9 during the previous year. Of these licenses, 13 are in the Mysore District and 2 in the Hassan District.

The quantity of ore collected during the year was 2,144 tons and the quantity exported 1,204 tons; the royalty payable on the ore exported is Rs. 446-4-0. There was no output or removal during the previous year.

Work was started afresh on the large open working near Shinduvalli, but was ordered to be stopped as the ground was not considered to be safe. Arrangements are being made to start underground work. The ore, which is of good quality, occurs in a series of lenses and systematic work will probably lead to the discovery of further supplies. In the Hassan District near Arsikere and Tiptur, there are large quantities of comparatively low grade ore and attempts are now being made to find a market for these.

The following statement shows the output for the year 1913 and the first six months of 1914:—

NAME OF LICENSEE	NUMBER OF LICENSE	DISTRICT	OUTPUT		
			1912	1913	1914 January to June
			Tons.	Tons.	Tons.
Mr. J. Burr ...	337 & 381	Mysore ... Hassan ...	...	588	1,150
Mr. V. Manickavelu Mudaliar ...	402 & 403	Mysore ...	...	826	550
		Total ...	...	1,414	2,060

III. MAGNESITE.

Six licenses were current for magnesite (and chrome) against five in the previous year. On some of these blocks a good deal of work has been done by the Tata Iron and Steel Company and 2,112 tons of magnesite are reported to have been excavated. Some good veins of magnesite have been exposed and there are prospects of its being utilized for the preparation of burnt magnesite and magnesite bricks in connection with the Tata Iron and Steel Works. A scheme of work has been outlined and experiments are being made in the preparation of bricks from the Mysore material.

The following statement shows the output for the year 1913 and the first six months of 1914:—

NAME OF LICENSEE	NUMBER OF LICENSE	DISTRICT	OUTPUT		
			1912	1913	1914 January to June
			Tons.	Tons.	Tons.
The Tata Iron and Steel Works, Ltd.	385, 386, 387, 388, 389, 397 and 401.	Mysore ...	...	2,112	1,281
		Total ...	...	2,112	1,281

IV. IRON ORE.

Six prospecting licenses and one exploring license in the Bababūdan Hills were current up to the end of June 1914. A certain amount of exploratory and examination work has been done, but none of the deposits have been opened up and the work has added little, if anything, to the results already obtained departmentally. An extended inspection of the ground was made during the year and some large samples have been taken by the department for further practical investigation. An interesting series of iron ores in the neighbourhood of Gungur and Ubrani was mapped and examined during the course of survey work. An inspection of some of these showed them to be of comparatively low grade, but further work has resulted in the discovery of better ores running from 50 to 55 per cent of iron. A number of samples have been taken for analyses and until the results of these are known it is not possible to estimate the value of the finds or whether prospecting is desirable.

V. MICA.

Four prospecting licenses were current at the close of the year against six at the close of

the previous year. Of these four licenses, two were in the Mysore District, one in the Hassan District and one in the Chitaldrug District. The principal producer continues to be the Kabbur Mine in the Hole-Narsipur Taluk in the Hassan District from which were exported to England 3,547 lbs. of clean mica as against 2,875 lbs. in the previous year. The report from England in regard to the sale value of the mica exported is awaited for the purpose of assessing the royalty payable on the ore. In the Mundur Block in the Yedatore Taluk a small quantity of 20 lbs. of clean mica was obtained but has not been exported.

The following statement shows the output for the year 1913 and the first six months of 1914 :—

NAME OF LICENSEE	NAME AND NUMBER OF BLOCK	OUTPUT		
		1912	1913	1914 January to June
		lbs.	lbs.	lbs.
Mr. T. Chinnasamy Iyer	Mundoor-346	152	20	...
Do	Kabbur-350	4,910	1,000	5,574
Total	...	5,062	1,020	5,574

VI. COPPER.

Two prospecting licenses were issued for copper ore of which one was for a block in the Mysore District and the other for one in the Chitaldrug District. Five tons of copper ore are reported to have been extracted from the block in the Mysore District. An inspection of this find was made, but the indications do not disclose any well-marked vein or body of ore. The richer portions are due to superficial segregation from a decomposed rock (probably a dyke) which is impregnated with a small quantity of copper. Sufficient work has not been done at present to determine whether any considerable body of payable ore exists.

VII. ASBESTOS.

From the Kabbur Mine in the Hole-Narsipur Taluk, Hassan District, a quantity of 10,788 lbs. of asbestos is reported to have been exported during the year under report and realized a net sum of Rs. 165-13-0 on which a royalty of Rs. 8-4-0 has been realized.

The following statement shows the output for the year 1913 and the first six months of 1914 :—

NAME OF LICENSEE	NAME AND NUMBER OF BLOCK	OUTPUT		
		1912	1913	1914 January to June
		lbs.	lbs.	lbs.
T. Chinnasamy Iyer	Kabbur-350	...	...	10,788

VIII. CORUNDUM.

The number of licenses for collecting corundum that were current at the close of the year under report was 25 against 30 in the previous year. The taluks from which the mineral was mostly obtained during the year were Koratagere, Maddagiri, Sidlaghatta, Pavagada and Doddballapur and some small quantities were also produced from the taluks of Gubbi, Kunigal and Tumkur. The quantity exported during the year as compared with previous years is shown below :—

Year	Number of licenses		Quantity exported	Royalty
			cwts.	Rs.
1910-11	...	2	11	6
1911-12	...	16	1,253	668
1912-13	...	30	4,060	2,230
1913-14	...	25	3,330	1,773

The following statement gives the output for the calendar year from the various taluks:—

NAME OF LICENSEE	TALUK	OUTPUT					
		1912		1913		1914 January to June	
		cwts.	lbs.	cwts.	lbs.	cwts.	lbs.
1. V. Sivaramiah Chetty ...	Chamrajnagar ...	6	87	.....	.....		
2. M. Balaji Rao ...	Malvalli ...	38	4	.....	.....		
3. Katte Ramiah and Abdul Shukur.	Maddagiri ...	425	0	1,100	50	378	44
4. Katte Venkataramiah ...	Koratagere ...	1,705	90	1,851	88	151	88
5. Abdul Gaffur Saheb ...	Sidlaghatta ...	295	14	.....	.....		
6. Shanbhog Hanumanthappa...	Tumkur ...	87	94	67	42	.....	
7. B. Mohadeen Saheb ...	Sidlaghatta ...	317	34	285	76	151	40
8. Narayanjee Vindravan and K. Heerachand.	Dodballapur ...	.....		94	97	80	106
9. K. Heerachand...	Kunigal ...	.....		34	17	.....	
10. Narayanjee Vindravan ...	Gubbi ...	.....		45	60	10	19
11. T. Abdulla Saheb ...	Pavagada ...	.....		201	28	.....	
12. Dosa Sheriff Sait ...	Arsikere ...	.....		341	58	.....	
	Total ...	2,875	99	4,022	68	772	73

D.—INSPECTION OF MINES.

I. General.

I continued to be in charge of the Inspection of Mines during the year.

Chief Inspector of Mines.

Seven visits covering 39 days were made to the Kolar Gold Field in connection with accident enquiries and general inspection. Inspections were also made of the Jalagargundi Mine, the gold prospecting blocks in the neighbourhood of Honnali, the Workington's property at Shimoga, the prospecting work for Iron Ore on the Bababudans, and the chrome workings at Shinduvalli.

Inspector of Mines.

During the year under report Mr. R. Bocquet, who had been on furlough, returned on the 29th November 1913 and assumed charge of the office and duties of the Inspector of Mines, and, since that date, has been in residence on the Kolar Gold Field.

Deputy Inspector of Mines.

Mr. L. H. Beckwith, who continued to officiate as Inspector of Mines until relieved of his officiating appointment on the above date, was also in residence on the Kolar Gold Field throughout the year with the exception of 18 days' privilege leave of absence from the 13th to 30th May 1914 (both days inclusive).

As usual all the fatal and the more important serious accidents were personally enquired into and, the localities in which they occurred, invariably inspected. Mr. Suryanarayana Rao, Mining Assistant, rendered valuable assistance and enquired into the majority of the less important accidents. He was absent on privilege leave for one month and three days with effect from the 9th July 1913 and again for ten days from the 27th May 1914.

In addition to this work, as far as time permitted, systematic inspection of the underground workings was carried out by the Inspectors of Mines, all working places being visited during the year, the majority of them more than once. The routine work of the office was

attended to, prosecutions conducted and many enquiries held into cases which did not result in accidents but constituted breaches of the Mining Rules.

The Deputy Inspector of Mines held the usual examinations for the grant of certificates once in each week ; when necessary, assistance was given by the Inspector of Mines.

The Inspection Bungalow, occupied by the Officiating Inspector of Mines, was vacated by him on the return to duty of the Inspector of Mines from long leave, the latter taking up his residence in it from the date of his return to duty. A small extension has been sanctioned to the north wing of the above bungalow and the work put in hand.

The new building for the office of the Inspector of Mines, sanctioned by Government in their Proceedings No. (Geological) 2145-7, dated 24th February 1913, was commenced in the middle of March 1914, since when the work has proceeded without interruption and good progress has been made. It is hoped the building will be ready for occupation before the end of the calendar year 1914.

The following table shows the number of examinations held and certificates granted up to the end of the year :—

YEAR	MESTRIS		BLASTERS	
	Number examined	Number passed	Number examined	Number passed
Total up to June 1913	7,929	7,680	5,723	5,483
For 1913-14	560	559	471	443
Total	8,489	8,239	6,194	5,926

Duplicate tickets (discs) to the number of 48 were also issued to Mestris and 7 to Blasters who had lost the originals held by them.

II. Labour employed.

The number of persons employed in the Mining Industry in 1913 was 27,027 against 27,088, showing a decrease of 61.

Of this number, 25,571 were employed in Gold Mining against 26,508 in 1912, 588 in Manganese Mining against 511 in 1912, and 218 in Mica Mining against 69 in the previous year. In Magnesite Mining 323 persons were employed, 317 in Chromium and 10 in Copper Mining.

Of the 25,571 employed in Gold Mining, 525 were Europeans, 336 Anglo-Indians, and 24,710 Indians, a total of 14,970 being employed on underground and 10,601 on surface work.

III. Accidents.

(a) STATISTICS FOR THE YEAR 1913.

The total number of accidents reported for the year 1913 was 286 as against 294 during the year 1912.

Of these accidents :—

47 were fatal,
231 were serious,
8 were non-mining.

Total 286

The total number of fatal and serious accidents was therefore 278 being at the rate of 10.29 per 1,000 persons employed.

The corresponding figures for the year 1912 were 285, a rate of 10·52 per 1,000 persons employed.

Of the above 278 separate accidents :—

38 or 13·67 per cent were due to negligence,
31 or 11·15 per cent were due to recklessness, and
209 or 75·18 per cent were classed as unavoidable.

The corresponding figures for the year 1912 are :—

30 or 10·53 per cent were due to negligence,
26 or 9·12 per cent were due to recklessness, and
229 or 80·35 per cent were classed as unavoidable.

In the 47 fatal accidents, 112 persons were killed, which gives a mortality of 4·14 per 1,000 persons employed, as against a mortality of 3·32 per 1,000 employed during the year 1912.

The death rate in the gold mines, which as usual employed the greater proportion of the labour, was 4·38 per 1,000 against 3·36 in 1912.

In both groups these figures show a considerable increase over those of the previous year, but this can be accounted for by the fact that in one accident alone, which occurred at Edgar's Shaft, Mysore Gold Mine, on the 21st August 1913, no less than 42 persons were killed or 37·50 per cent of the total fatalities. Eliminating this one disastrous occurrence, the figures would then compare very favourably with 1912 and previous years reducing the death rate to 2·59 per 1,000.

There were 6 fatal accidents during the year which involved the loss of 2 or more lives, 71 persons altogether being killed in these 6 cases or 63·39 per cent of the total number of fatalities. Of these, 5 were due to unavoidable causes and 1 to negligence.

During the year 1913 air blasts and quakes were responsible for 8 accidents involving the loss of 31 lives. This compares favourably with the previous year in regard to the actual number of accidents, but the mortality is a little greater, the corresponding figures for 1912 being 11 accidents in which 29 persons were killed or who eventually died from the results of injuries received.

In four of the above accidents due to this cause no less than 27 persons lost their lives, three occurring at the Champion Reef and the other at the Ooregum Gold Mine.

The total number of fatal accidents for the same period in connection with the use of explosives in blasting operations underground, all of which occurred on the Kolar Gold Field, was 8 involving the loss of 8 lives. Compared with the previous year there is a considerable reduction, the corresponding figures being 10 accidents involving the loss of 15 lives.

Of the fatal accidents due to explosives :—

1 was caused by the premature explosion of the charge (attempting to fire too many holes in one round),

1 was due to the presence of some blasting gelatine—probably in a socket—while “picking” up loose ground,

and 6 were caused by boring into misfires or sockets containing a portion of a charge of blasting gelatine.

Of the above 8 fatal accidents all, with one exception (classed as unavoidable), were due to negligence or recklessness on the part of the mestris and blasters concerned, *i.e.*, persons in charge.

Of the 47 fatal accidents in 1913 :—

22 or 46·81 per cent were unavoidable,
9 or 19·15 per cent were due to recklessness,
16 or 34·04 per cent were due to negligence.

Of the 231 non-fatal accidents :—

187 or 80·96 per cent were unavoidable,
22 or 9·52 per cent were due to carelessness or recklessness,
22 or 9·52 per cent were due to negligence.

Classification of accidents in 1913.

	Fatal acci- dents	Non-fatal accidents	Deaths	Serious injuries
1. Air-blasts (quakes) ...	3	5	19	6
2. Air-blasts (bursts of rock) ...	5	67	12	82
3. Falls of loose rock ...	4	13	4	14
4. Falling in shafts, stopes, etc. ...	14	12	14	13
5. Explosives (misfires, etc.) ...	8	15	8	21
6. Trucks and Tramways ...	0	34	0	34
7. Run over or struck by skips ...	2	4	3	5
8. Hoisting ...	3	6	44	6
9. Other machinery ...	2	5	2	5
10. Falls of rock and materials in shafts...	2	9	2	10
11. Other causes ...	4	61	4	61
Total ...	47	231	112	257

Non-casualty accidents reported under Rule 165 of the Mysore Mining Rules.

Twenty-two non-casualty accidents were reported under this head during the year caused as follows :—

(1) Engine running out of control ..	1
(2) Fracture of any essential part of winding engine, crank shaft, couplings, bearings, gearing, clutch, drums, or drum shaft ...	2
(3) Fracture of winding rope or of its attachment to skip, cage, or drum ...	2
(4) Fracture of pit-head sheave or axle or bearings of same ..	0
(5) Failure of efficiency of brake ...	0
(6) Failure of safety catch to act when required ...	0
(7) Failure of device for prevention of overwinding or of detaching hook to act when required ...	0
(8) Overwinding of cage or skip ...	17
(9) Bursting of anything containing steam, compressed air or other substance at high pressure ...	9

Penalties were inflicted in 11 cases and varied from a fine of one day's pay to dismissal.

(b) NOTES ON ACCIDENTS.

Few accidents of the year call for special comment, but unfortunately the most serious of its kind which has ever occurred in these mines took place at the Mysore Mine and resulted in the loss of 42 lives.

Edgar's Shaft Cage Accident.

The accident took place at Edgar's Shaft, Mysore Mine, on the 21st August 1913 and was due to the fall of a double decked cage carrying 42 men in consequence of the fracture of a portion of the clutch which secures the winding reel to the engine shaft. The accident was of an altogether exceptional character and was made the subject of enquiry by a special Commission appointed by Government. The Commission drew up a report which has already been published together with a Government Order thereon. The Commission expressed the

opinion that the accident was not traceable to any negligence on the part of the employees of the mine and that the machinery appeared to have been carefully designed and in good working order. A further departmental enquiry into the technical features of the accident has been made, but the cause of the fracture of the pin of the clutch, which was the immediate cause of the accident, remains unexplained. The material of the pin is reported to have been quite sound and its strength ample for the work it is normally called upon to do, but it has been pointed out that it may have been subjected to bending stresses which were not allowed for. It has been decided to discontinue the use of this clutch and a clutch of a different design will be adopted in future. In the meantime the clutches on the engine have been securely bolted up so that they are now out of commission and the winding is being carried on without them at some inconvenience to the progress of work.

The fact that the brakes failed to arrest the cage, although they complied with the statutory requirements both before and after the accident, has been the subject of special investigation and it has been calculated that in the exceptional circumstances of this accident, in which the reel had become detached from the shaft and was moving at a high speed, the weight actuating the brake was insufficient to overcome the momentum of the moving masses and bring the cage to rest. In consequence of this decision the reel has been strengthened to enable it to withstand a greater brake pressure and the weights have been increased. This increase of brake pressure is not considered to be necessary at present as the clutches are out of commission, but has been introduced for the sake of experience with a view to subsequent work when new clutches are fitted.

With regard to safety catches for stopping the descent of the cage, it is admitted that no catches would have been of any use in this particular accident and that there is no form of safety catch which could be usefully applied in the shaft. The question of the possibility of introducing certain forms of safety catches in new shafts is still under consideration.

Full details of the accident and of the results of the enquiry will be found in the Appendix to this report.

Accident at Circular Shaft, Champion Reef Mine, due to detachment of bucket from rope.

This accident, in which three men were killed, presents some features of interest. The Circular Shaft, about 3,800 feet in depth, is lined with brick and the sinking and bricking has been carried on by means of a massive wooden stage suspended from capstan ropes.

A large bowk, or bucket, attached to a winding rope by a well-known form of hook or clevis carries men and materials up and down the shaft. At the time of the accident sinking had been completed and the equipment of the shaft with bearers and guides was in progress. The stage was suspended about 1,360 feet from the bottom of the shaft and is provided with central doors to permit of the bowk passing through.

The stage had been moved up and down several times during the shift and after each move the position of the bowk when it reaches the stage is marked on the drum or rope. The last move was downwards for about 60 feet the bowk being at surface. Three men got in and were lowered with instructions to ring 1 when near the stage the doors of which were closed. The driver lowered and slowed off when he judged the bowk to be near the stage. The signal 1 was received and the bowk stopped almost at once. The signal to raise was then received and the rope with the clevis intact was wound up to surface but no bowk was attached. Men who were on the stage say that the bowk descended slowly, broke through the doors and fell to the bottom of the shaft, but were unable to say how it had become detached from the clevis. The rope was brought to rest within a few feet of the bowk striking the stage. The first point is how the bow of the bowk became detached from the clevis. The latter is a strong iron hook, but the entrance to the hook is closed by a tongue, opening inwards, and kept in position by a lever or bridle the weight of which keeps the tongue pressed against the point of the hook making the latter a closed ring. As neither the bow nor the clevis were damaged in any way it is necessary to account for the bow getting out of the latter. When the bowk struck the stage the jerk must have thrown the clevis upwards and turned it so that the tongue was nearly horizontal instead of nearly vertical. The weight of the bridle would then cause the tongue to open downwards and the bow must have been momentarily immediately below the opening permitting the clevis to fall or be jerked

off it before the bowk got away through the broken doors. The incident must have been practically instantaneous and those on the stage were unable to observe what happened.

The clevis is a good one and has been in use for many years without any mishap and the chance of the precise movements by which it became detached taking place again is exceedingly remote. A screw bolt has now been provided which pins the tongue and the point of the hook together so that the former will remain closed no matter into what position the clevis may be turned. The bolt will be used when men are travelling or when steady work is in progress with a single bowk. I do not consider it possible to insist on its use when fast winding of stuff is going on during sinking during which time full and empty bowks are changed regularly at the top and bottom of the shaft.

Another more important point is that at any change of level of the stage the bowk should invariably be lowered to the stage and the position mark made on the drum before men are allowed to go down in it. This means that some one should always remain on the stage when its position is changed in order to signal the advent of the bowk. This procedure will be adopted in future and there should be no room for any error of judgment on the part of the driver as to the exact position of the stage.

Air-blasts.

During the year 1913 the number of fatalities from air blast was 31 compared with 29 for 1912, an increase of two. For the official year 1913-14 the results are however more favourable than for the preceding year and there is a general impression that during the latter portion of the year blasts have not been quite so frequent or so severe.

Extracts from an interesting report by Mr. Henry M. A. Cooke on the Seismological observations will be found in the next section. It is too early to say whether there is any appreciable reduction in the number or severity of these phenomena and as accidents have a habit of going in runs with intervals of comparative freedom one hesitates to say much about their behaviour.

For some years past the most strenuous efforts have been made to cope with these dangerous and difficult phenomena and neither money nor thought has been spared. Timbering has been increased to an altogether unusual extent, systematic filling has been in progress for years and portions of the mines which are considered to be particularly liable to danger have been closed or abandoned. Further proposals regarding changes in methods of stoping or development are under constant discussion and trial and I have no doubt that any sound and workable scheme which was put forward would receive ample attention and fair trial.

One trouble is that we really understand so little about the precise nature or origin of so many of these air blasts and quakes and another lies in the fact that any particular line of action may take so long to make its influence felt and the results may be so obscured by a variety of complications that it is often impossible to say whether an improvement is being effected or not, or to what precisely any improvement may be due.

There is one and only one way to avoid entirely accidents due to air blasts and that is to close the mines down altogether. That would be like curing a man of being sick by cutting his throat, but the position by no means warrants any such drastic procedure. The larger accidents in which a number of lives are lost are undoubtedly impressive and awe inspiring, but taken over a number of years the average fatalities are by no means very excessive though regretably high. We hope and believe that this average is capable of being reduced, but ordinarily speaking the majority of these accidents must be regarded as unavoidable taking into account conditions and experience at the time. This remains substantially true even though the results of work or methods in the past and now should succeed in securing more satisfactory results in the future. Although there can be no question of closing the mines as a whole, there may be good reasons for closing certain portions which are believed to be specially liable to danger or which present features which are considered to be undesirable according to our present lights. If we consider the great uniformity of the rocks throughout the Kolar Field it is difficult to understand why these air blasts should be so markedly concentrated in Champion Reef. The fact that veins dip less steeply in Mysore, which has been on the whole comparatively free from these shocks, and much more steeply in Champion Reef and Ooregum which have suffered most, does not appear to help us, but rather the contrary.

About 10 years ago when these phenomena began to attract serious attention and I took up a serious study of them the southern portion of Oregum was I think the most affected region. Since then the Champion Reef has taken the premier place in this undesirable contest and in view of the general uniformity of the rocks one seeks for other features in which a maximum or minimum is reached in the most affected areas. A study of the underground workings shows that in Champion Reef down to the 25th level we have the area of maximum intensity of stoping for the whole field. Although in the Mysore Mine a greater bulk of rock has been removed the stoping has been spread over a wider area or rather series of areas with intervening patches of solid country whereas in Champion Reef stoping has been almost continuous from one end of the mine to the other from about the 19th to the 25th level and whether the conclusion is justified or not the association of this feature with the increase of air blasts in this zone is a reasonable hypothesis in the investigation of an intricate problem.

As the result of detailed discussion of the problem with Mr. Henry Gifford, the Superintendent of the Mine, it was decided during the year to shut down the whole of this large section of the mine and to allow it to fire itself off if it wants to do so for some considerable period. Enormous quantities of waste rock have been put into these stopes for some years past, but this has not sufficed to check the air-blasts; on the contrary they have increased. We hope that in the course of time the air blasts will tend to wear themselves out and that the fractured hanging wall will rest comfortably and securely on the filling. It may then be possible to attach the valuable ore reserves in the area. It may not be realized what a decision of this character may mean from a mining point of view and it may be well to note for the information of those who appear to think that the Mining Companies take no trouble or shirk expense to avoid accidents that the closing of this section means the locking up of a good deal of valuable ore which has already been developed and opened up and from which a quarter of a million sterling, or more, could be easily and cheaply extracted. How long it will remain locked up or whether it will be lost for ever must be left to the future to decide.

In pursuance of the same policy endeavours are being made to prevent a repetition of the special circumstances of this case and to arrange for working in distinctly separated blocks. In many cases this is easy enough as the shoots are usually separated by large patches of barren ground, but the idea is to go farther than this and to divide up the shoots themselves into alternate stoping sections and huge pillars. From a mining point of view it may not be easy to carry this out and the problem of attacking the huge pillars will then remain. The scheme is however under discussion and I hope that in default of any thing better it will be possible to introduce it with appropriate modifications to suit the circumstances of different mines.

With regard to the filling of stopes, at any rate on the steeper portions of the veins, the practice of taking the stopes down a certain distance and then putting in a stull and filling above it before continuing the stope in depth has been discontinued for some time past. These stopes are now carried down the whole depth of 100 feet or so from one level to another without any filling, but with stulls at intervals covered with heavy lagging so as to catch up pieces which may fall or burst off. In the case of an air-blast some or all of these stulls might be broken or thrown out, but our experience has been that the same thing occurs even when filling has been put in above; only in the latter case the filling is likely to go to the bottom and increase the mess and the difficulty of rescue. The main reason for the change of procedure is that in filling shallow sections of stopes there is great difficulty in securing complete filling and compactness in these shallow sections with the result that at the end of it all the filling is not of much use and does not help to support the hanging for a long time. This means heavy pressure on the unstopped margins for a long time and tending for the hanging to continue to fracture. Under the present scheme when the stope has been completed to its full depth the filling is shot right down from top to bottom forming a much more compact mass. This is done before the next section of the stope is taken down and so far as we can judge the scheme has been satisfactory.

I have referred to this before, but I do so again now in order to suggest that this more effective filling may be producing some beneficial effect in regard to the general tendency for quakes to occur in stoped areas.

As I have already said we cannot expect to get rid of air-blasts and quakes. In discussing these phenomena some years ago * I endeavoured to distinguish between air-blasts and quakes both in regard to intensity and mode of origin. Since then the air-blasts or the bursting of rock as a result of internal strain and unconnected with pressures developed by the stoping out of large areas have shown a tendency to increase in violence. At any rate much more violent bursts are now known and recognized than was the case ten years ago. This appears to be quite local and sporadic but the fact that they are sufficiently violent to break large quantities of rock and to fracture timbers suggests that many quakes which occur in the neighbourhood of pillars in stoped areas may sometimes be due to the same cause and not merely to strain or fracture caused by excessive superincumbent pressure.

The following extract from a report on a case which occurred on the 20th August 1913 at the bottom of Carmichael's Shaft, Champion Reef, may be of interest as showing the conditions under which air-blasts may occur.

Air-blast in the sink of Carmichael's Shaft, Champion Reef Mine.

I inspected the scene of the accident on the morning of the 22nd August in company with the Superintendent, the Chief Underground Agent and Mr. Beckwith.

The shaft is now nearly 4,700 feet from surface on the underlie, it is in the hanging wall, about 70 feet west of the lode, and there has been no stoping for a distance of 1,000 feet above the scene of the accident. Except for a few cross cuts and levels the shaft is in rock which is solid for 1,000 or more feet in every direction around the point at which the air-blast took place.

Moreover this shaft has now been sunk for over 4,000 feet and the Superintendent informs me that hitherto it has been free from troubles of this kind.

Both from the surrounding conditions and from its past record this shaft must have appeared to the miner as a safe one to work in and in most mining centres the sink would have been carried down for a considerable depth with very little, if any, timbering. On the Kolar Field, however, the chance of the occurrence of air-blasts had led to the adoption of careful methods of timbering even in places which would appear to be quite secure from heavy ground or normal falls of the roof and in the present case I must admit that the timbering was excellent and would have been regarded by miners from other fields as needlessly abundant and expensive. The square sets had been brought down to within 10 to 12 feet of the bottom of the sink down to which point the hanging wall was heavily lagged. The skip way had been completed down to within 25 feet of the sink and was only awaiting the further deepening of the sink, for a further permanently lagged section to be put in. The only exposed portion was therefore the 25 feet of the footwall of the shaft which was protected by the wall plates of the sets but not lagged. If I had inspected this shaft before the accident or if I had been working in the shaft myself I should not have considered any further protection necessary.

The air-blast completely shattered the footwall for a distance of some 50 feet up from the sink, breaking some of the lagging planks in the upper portion and throwing out a large quantity of rock from the lower unlagged portion some of which fell into the sink and caused the injuries reported. Mr. Beckwith is of opinion that if this lower portion of the footwall had been covered with temporary lagging behind the wall plates a good deal of the fractured rock would have been retained and prevented from falling into the sink. Mr. Beckwith suggests that I do not agree with this opinion, but that is not so. I think it quite possible that some of the lagging might have withstood the shock, but in dealing with problems of this character we must not forget that if the shock is a severe one the lagging itself and perhaps even the shaft sets might be smashed and sent into the sink in addition to the falling rock and the total damage increased.

On the whole however, after my inspection of the damage done I am in favour of putting in temporary lagging on the footwall right down as far as the sets will allow and the Superintendent is prepared to have this done. I do not consider that the omission to do so hitherto is in any way due to want of forethought or parsimony; on the contrary the timbering of the shaft appears to me to have been most carefully and even lavishly carried out.

* Bulletin No. 3, Mysore Geological Department.

IV. Meteorology and Seismology of the Kolar Gold Field.

EXTRACTS FROM A REPORT FOR THE YEAR 1913 BY MR. HENRY M. A. COOKE.

Meteorology.—Rock and air temperatures were taken underground at Champion Reef and Ooregum Mines. In both mines the rock temperature, where unaffected by air circulation, showed very little deviation from the average temperature gradient of the Field, previously taken, of 1° Fahr. rise in each 198 feet of vertical depth.

The temperature and humidity of the air in these mines, in levels in direct communication with the large vertical shafts, show the very great benefit derived from the enhanced air circulation from these shafts, for not only are the levels cooled, but what is more important, they are supplied with drier air.

The difference in the rock temperature in a crosscut to a shaft before communicating with the shaft, and after, is very marked and shows that the rock is considerably cooled by the circulation of air through the level, at a lower temperature than that of the rock, and by radiation, but it is probable that should the air circulation be suspended for any length of time, the temperature of the exposed rock would again rise to the normal temperature of the rock at that particular depth.

The heat in some stopes, which are above or below the air currents, is partly due to this cause, combined with an increase in humidity, which allows the heat from the rock to be the more readily transmitted from one wall of the stope to the other.

For some months the temperatures of the air in the downcast and upcast shafts at Champion Reef and Ooregum Mines have been regularly taken, and it is found that at both mines the temperature of the downcast air taken in the bottom cross-cuts has so far remained practically steady at 84° Fahr. at Champion Reef and 89° Fahr. at Ooregum, which may be taken as 8° and 13° higher than the mean air temperature at surface. The increase and steadiness of the temperature seem to indicate that the air absorbs heat from the walls of the shaft, and it will take a longer period of observations before it can be seen if the downward air will eventually reduce further the temperature of the rock walls of the shafts. The difference of 5° Fahr. between Champion Reef and Ooregum is probably due to the shaft at the former mine being lined with brick and not equipped, and therefore offering less resistance to the down-drawn air, than must exist at the Ooregum Mine where the shaft being timbered and fully equipped with dividings and haulage roads, allows the air to be longer in contact with the heated sides of the shaft.

The difference in the temperature of the downcast and upcast air at the Ooregum Mine is from 7° Fahr. to 8° Fahr. At Champion Reef owing to an accident to the thermometers, the average upcast temperature is not available at present, but new thermometers will shortly be exposed, and the observations carried over a long period should supply both useful and interesting information.

Seismology.—The two "Weichert" horizontal and vertical seismographs have worked satisfactorily throughout the year.

The local shocks recorded amount to 13,588 or 37.23 per day, as against 12,628 or 34.5 per day during the previous year, or an increase of 960 shocks during the year or 2.73 per day.

The number of shocks recorded are tabulated according to the months, the days and the hours in which they occurred.

The number and intensity of the shocks felt on the different mines are also tabulated.

In again attempting to discover any certain periodicity in the local shocks it is found that whereas last year the maximum number (taking the mean of three months) occurred in April, this year, the maximum occurred in October, and the greatest number were recorded between the 19th and 20th hours, whilst last year the maximum occurred between the 15th and 16th hours.

The mines have continued to record the shocks felt or observed, and the mean number so recorded amount to 2.1 per cent of those recorded by the seismographs. The Ooregum and Champion Reef Mines have again recorded the greatest number of shocks.

The maximum number of shocks recorded by the mines occur between the 9th and 11th hours, whilst last year the maximum number were recorded between the 12th and 13th hours.

From the above details it can be seen that there is considerable difference between the results obtained during 1913, as against those of 1912, and as remarked in former reports, there seems to be no periodicity in either the number or intensity of the shocks.

The results appear to confirm the remarks made in the report for the year 1911, that the shocks can be accounted for by the relief, through the underground excavation, of the previously existing forces in the rock.

The observations of the two spirit levels in the Observatory, which were installed in January 1913, are interesting, but it cannot yet be said that they prove that the local shocks have caused a change of level, for, other influences, such as changes of temperature, barometric pressure, precipitation, and other forces tend to the "displacement of zero", and it is doubtful if with spirit levels, however sensitive, the different periodicities of the several forces could ever be separated or determined, but no doubt this could be done with a certain type of horizontal pendulum.

The results hitherto, taking the observations for the whole year, show that there has been a rise to the South, and a rise to the East, or a fall to the North and fall to the West, which changes of level may be due, to some extent, to the earth movements accompanying the local shocks, added to the causes previously mentioned.

In conclusion I wish to again express my indebtedness to the Superintendents of the Mines for their continued help in supplying me with copies of the careful records which are kept of the occurrences of local shocks.

Y. Prosecutions.

(a) In connection with thefts, etc., of Mining Material.

The following statement shows the number of cases dealt with during the year 1913, as compared with 1912, by the Assistant Commissioner and First Class Magistrate, Kolar Gold Field, in connection with theft and illegal possession of mining materials under Section 6 of the Mysore Mines Regulation:—

Year	Number of cases	Number of persons put up	Number of persons convicted	Value of property recovered
				Rs. a. p.
1913	80	102	79	8,122 8 8
1912	74	107	77	874 4 3

The following table shows the various kinds of mining materials in respect of which prosecutions were instituted during the year 1913:—

Kind of material	Number of offences dealt with	Number of persons charged in each case	Number of convictions	Value of property recovered
				Rs. a. p.
Gold quartz	15	21	16	111 3 0
Auriferous tailings	12	20	10	95 3 0
Mercury ... ..	...	...	...	.....
Amalgam	11	12	12	6,264 10 0
Sponge gold	7	10	4	797 14 0
Bar gold ... ..	...	...	...	.....
Cyanide gold	1	2	1	162 12 0
Iron pyrites ... ..	...	...	...	.....
Explosives	3	3	2	123 3 11
Explosives*	...	...	...	4 12 0
Tools	16	18	18	549 12 9
Wood	9	10	10	8 14 0
Candles	6	6	6	4 1 0
Total	80	102	79	8,122 8 8

* Explosives found by the Police and confiscated in Court, but for which no person was chargeable.

(b) In connection with Accidents, Breach of Rules, etc.—

The following is a comparative statement for the three years 1913, 1912 and 1911 :—

	1913	1912	1911
Number of cases ...	38	48	48
Number of persons put up ...	45	72	51
Number of persons convicted ...	40	68	50
Number of persons acquitted ...	4	4	1
Number of persons discharged ...	...	...	...
Number of persons not found ...	1	...	...
Number of cases pending ...	...	...	...

Of the above, 16 cases were put up under the Indian Penal Code and 22 under the Mysore Mines Regulation. The penalties in the case of conviction ranged from fines of Re. 1 to Rs. 25 and imprisonment from 2 weeks to 3 months.

During the year, 12 persons were prosecuted for various breaches of the provisions of the Mines Regulation and Rules framed thereunder resulting in accidents, 9 of whom were convicted, 2 were acquitted and 1 absconded.

In one case not resulting in an accident one person was prosecuted and convicted for a breach of the above Rules.

Less serious offences committed in connection with 20 accidents entailed the departmental punishment of 28 persons by fines and by cancellation or suspension of their certificates. Similarly 6 other persons were dealt with departmentally for offences committed in connection with the provisions of the Rules not resulting in accidents.

E.—A BRIEF REPORT OF THE WORKING OF THE KOLAR GOLD FIELD POLICE FOR THE YEAR 1913-14.

(BY MR. SIDNEY PRITCHARD, SUPERINTENDENT OF POLICE.)

During the year under report I was in charge of the Circle exclusive of a period of one month from the afternoon of the 24th October to the forenoon of the 25th November 1913 when I was appointed Deputy Inspector-General of Police in Mysore (temporary) during the tour of H. E. Lord Hardinge of Penshurst, Viceroy and Governor-General of India, to the province. During the above period Mr. F. S. Raghava Char, Amildar of Bowringpet, was appointed to act as Superintendent of Police, Kolar Gold Field.

Beats, Patrols and Co-operation of the Police with the Mines Watchmen.

The working of the beats and patrols has been receiving special attention and has been carried out as efficiently as possible during the year under report. A strong patrol has been maintained at night in order to guard against the depredations of Criminal gangs such as voddars, korachars, etc., on our borders who committed a series of burglaries on the outskirts of the Mines in the months of November, December and January last giving a lot of trouble till they returned to British limits. The watch Establishment of the Companies continued to render invaluable help to the Police in the actual Mining Area. Constituting as they do at present a fine body of men and in spite of their continued assistance to the Police within that area, they cannot help them beyond up to the borders in consequence of which the beat and patrol work must inevitably suffer proportionately outside their system of work, which however, was considerably extended during the year.

A daring case of house-breaking was committed by a gang of men who broke into the Silver Room of the Mysore Mine No. 1 Mill by cleverly sawing through the iron bars and purloining gold worth Rs. 5,426, the whole of which, the Police with the help of the Detective Department luckily succeeded in recovering and procured the maximum sentence on two members of the gang.

The subjoined statement gives details of the Force (Gold Field and Bowringpet Taluk) as it stood on the last day of the year and last day of the previous year:—

				1912-13	1913-14
Inspectors	...	...	...	11	10
Head Constables	...	...	...	19	19
Sergeants and Dafadars	...	...	...	11	11
Constables	...	...	...	277	276
Recruits	...	...	...	10	10

One Sub-Inspector and 16 men were temporarily sanctioned for the Kolar Gold Field Railway Police for a period of one year.

One 2nd Grade Head Constable, one Sergeant and 10 Constables were also sanctioned for the Bowringpet-Kolar Railway under the District Board.

Crime.—There has been a decrease of 46 cases which was due to a fall under house-breaking and theft and theft ordinary.

The amount of property lost was Rs. 16,003-8-4 which was more than in the previous year by Rs. 7,382-10-1. The reason for the increase is due to the case of house-breaking and theft which was committed in the silver room of the Mysore Mine No. 1 Mill in which gold amalgam to the value of Rs. 5,426 was lost and recovered.

The recovery of property lost amounted to Rs. 9,543-10-1 which is also greater for the above reason by Rs. 5,727-9-11.

The number of convictions to true cases and also the number of persons convicted were normal when compared with the previous year.

There were 43 cases under the Mysore Mines Regulation against 78 in the previous year. The reason for the fall in the number was due to less number of cases under Sections 17 and 19 and 18 and 19 of the Mysore Mines Regulation, as many of the undesirables have left the Field, and the provisions of Sections 18 and 19 are now very well-known to all hawkers and pedlars.

The appended statement shows the crime dealt with during the year under report on the Gold Field. As regards the percentage in recovery of property there has been a far better result than in the two preceding years the figures being 59·6 against 44·2 and 37·9 per cent.

The percentage of convictions to true cases as well as the percentage of convictions to arrests stood normal.

There were no cases of Murder, Dacoity and Culpable Homicide on the Field during the year. There was one case of robbery reported which ended in B Sheet, being found to be false on investigation. There were 127 true cases of house-breaking and theft reported as against 119 in the previous year. Of these 14 ended in conviction.

There were 154 cases of ordinary theft against 177 in the previous year. Of these 108 ended in conviction. The percentage of convictions to true cases was 68·7 against 59·06 in the previous year and 46·9 in the percentage of recovery of property against 64·8 in the previous year. The number of cases of receiving stolen property was the same as that of last year, the figures being 10 in both years. The cases of theft of Mining Material (receiving stolen property under the Mysore Mines Regulation) amounted to 53 with a recovery of property of Rs. 1,916-4-0 against 88 cases with a recovery of property worth Rs. 1,567-11-11 in the previous year. The number of persons convicted under these heads was 40 against 68 in the previous year.

In the Detective Department the expenditure for the year was Rs. 15,024-14-5 against 14,930-15-10 in the previous year. 17 cases were taken up during the year, of which, 13 ended in conviction, three were dropped and one was pending at the close of the year against 26 cases, 23 convictions, one reported in B Form, one in which no action was taken and one pending in the previous year.

Nineteen persons were arrested during the year, of whom 15 were convicted, 3 cases were dropped and one was pending investigation compared with 28 persons, 23 convictions, one discharged or acquitted; no action was taken against one, B sheet submitted against one and one pending investigation in the previous year.

Property to the value of Rs. 6,993-1-9 was recovered against Rs. 1,294-9-4 in the previous year.

Grave Crimes on the Kolar Gold Fields A and B Divisions (Champion Reef and Ooregum) for 1913-14.

Serial No.	SECTION OF LAW	CASES					PERSONS			PROPERTY				Percentage of recovery of property	REMARKS
		Reported	Disposed on B Form or refused	Total true cases	Convicted or detected	Percentage of convictions to true cases	Arrested	Convicted	Percentage of convictions to arrests	Lost		Recovered			
										Rs.	a.	p.	Rs.			a.	p.
1	Murder	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2	Culpable homicide	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3	Dacoity	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4	Robbery	...	1	...	...	...	2	...	...	...	...	...	...	...	...
5	House-breaking and thefts	134	7	127	14	11·02	53	20	37·7	10,106	11 0	6,177	8 6	59·3	...
6	Thefts	107	13	151	108	68·7	154	128	83·1	3,086	0 4	1,449	13 7	46·9*	...
7	Receiving stolen property	10	...	10	7	70%	18	8	44·4	1,627	8 0	1,052	10 0	68·3	...
8	Mining Regulation	13	4	39	30	76·9	53	32	60·3	883	2 0	863	10 0	97·7†	...
9	Criminal Secs. of C.P.C.	1	...	1	1	100%	1	1	100%	...	...	...	...	...	...
	Total for 1913-14	356	25	331	160	48·3	281	189	67·2	16,003	8 4	9,543	10 1	59·6*	...
	Total for 1912-13	402	36	366	177	48·3	320	205	64·0	68,620	14 8	3,816	0 2	44·2	...
	Total for 1911-12	365	17	348	200	57·4	351	253	71·4	9,076	5 5	3,442	3 3	37·9	...

* One case transferred to Ky. Police.
† One case transferred to Ky. Police.
do 2 cases

* One case transferred to Ky. Police.
† One case transferred to Ky. Police.
do
* 2 cases

F.—A BRIEF REPORT OF THE WORK OF THE KOLAR GOLD FIELD SANITARY BOARD DURING THE YEAR 1913-14.

(By MR. P. F. BOWRING, PRESIDENT OF THE SANITARY BOARD.)

Working of the Board.

The Board, as usual, consisted of 7 *ex-officio* and 7 non-official members.

Six ordinary meetings and one special meeting were held during the year. The latter was held on the 23rd September 1913, to pass the Administration Report of the Board for the year 1912-13.

The average attendance of members at the meetings was 5·3 in the case of official members and 4·4 in the case of non-official members.

Finance.

The year opened with a credit balance of Rs. 66,639. The receipts during the year under report amounted to Rs. 74,726 and the expenditure to Rs. 67,249 according to the preliminary accounts now made up in this office. (These figures are still subject to adjustments to be made in the Comptroller's Office, the figures reviewed and corrected up to the end of March 1914 by the Comptroller having now been received and adopted.)

The closing balance at the credit of the Board on the 30th June 1914, was Rs. 74,116.

Receipts.

The total income of the Board from all sources of revenue was Rs. 74,726 against Rs. 75,696 in the previous year (*Vide* Appendix 11). The more important variations under different heads of revenue are explained hereunder.

Collection by the Revenue Department.

These two items of revenue *viz.*, local cess and mohatarfa which are collected by the Revenue Department and credited to the Funds of the Board, amounted to Rs. 1,574 and 11,848 against Rs. 1,333 and 12,135 respectively in the previous year, the former showing an increase of Rs. 241 and the latter a fall of Rs. 287.

A. Local Cess. B. House Tax
including Mohatarfa.

Collection by the Sanitary Board.

Rupees 606 was realized from license fees for dogs against Rs. 753 in 1912-13, the small decrease of Rs. 147, being the result of the temporary reduction of fees from 0-8-0 to 0-6-0 in the case of dogs, and from 1-0-0 to 0-12-0 in the case of bitches as per the Board's Resolution No. 13 at their meeting held on 20th June 1913. These rates were levied only for a period of nine months commencing from 1st October 1913 to the end of June 1914, in order to adopt the official year from July to June for the levy of these taxes in conformity with the rules laid down in Government Order No. 2827—L. B. 333-11-3, dated 4th October 1913, instead of from October to September as was the practice in the previous years (*Vide* Government Order No. 484-5—L. B. 294-10-4, dated 18th July 1911).

License Fees.

Licensing of shops and stalls for the sale of food stuffs and other articles of human consumption yielded Rs. 1,045 or Rs. 70 more than in the previous year.

As the result of opening a new market near Stevens' Camp the market collections rose from Rs. 31,269 to Rs. 34,062, Robertsonpet market yielding Rs. 30,133, and that near Stevens' Camp, Rs. 3,929.

Markets.

The two slaughter-houses at Stevens' Camp and Robertsonpet realized a sum of Rs. 8,744 towards slaughtering fees or Rs. 316 less than in the year 1912-13. The fall is attributed to the exportation of sheep and live stock from Bowringpet (which is the chief source of supply to the Field) to other places than the field.

Slaughter Houses.

Ground rents collected from the Cooly Colonies under the control of the Board amounted to Rs. 9,647 against Rs. 9,106 (Rs. 10,981—1,875 sale proceeds of materials of zinc huts=

9,106) or Rs. 541 better than the previous year, due to better collections during the year, and also to the recovery of similar rents from the Cooly Colony near Dodavalagamadi village taken over and put under the control of the Board during the year.

Mutton and beef stall rents, etc., in Robertsonpet market and the rent from the arrack shop building adjoining this market built by the Board, aggregated Rs. 2,022 and Rs. 480 against Rs. 2,279 and Rs. 360 in the year 1912-13 respectively.

Other minor items. Rupees 1,982 were derived from other minor items as detailed below:—

	Rs.
1. Sale of the right of collecting blood in slaughter-houses ...	360
2. Sale of the right of collecting raw bones ...	225
3. Do hoofs and horns ...	150
4. Do entrails ...	160
5. Proportionate cost of the pay of washerman of Infectious Diseases Hospital credited to Sanitary Board ...	138
6. Sewage Farm Rent ...	70
7. Comptroller's adjustment—Dieting and contingent charges advanced to plague patients but since refunded to the funds of the Board ...	494
8. Comptroller's adjustment ...	1
9. Penalty paid by the Arrack shop contractor for not paying the rent in time ...	18
10. License fees for Hackney Carriages ...	173
11. Miscellaneous ...	193
Total	1,982

Rules under the Mysore Public Conveyance Regulation, VII of 1911, having come into force as per Government Order No. 4044—L. B. 330-11-5, dated 2nd October 1913, a sum of Rs. 173 was realized from the licensing of public conveyances (carriages and carts).

Expenditure.

The total expenditure incurred by the Board under all items during the year, aggregated Rs. 67,249 against Rs. 83,484 in the previous year, the net decrease of Rs. 16,235 being chiefly the result of (i) absence of the extraordinary item of expenditure, viz., Rs. 9,715 paid towards the contribution for improvements and alterations to the Maternity Hospital in the previous year, and (ii) water-supply pumping charges to Robertsonpet estimated at Rs. 4,966 (which yet remains to be debited to the Board's Funds) in the Board's Account in the year under report.

Rupees five thousand four hundred and twenty-six charged under this head comprises the following expenditure incurred by the Board. (i) Rs. 5,000 part payment towards extension of street lighting by electricity to Robertsonpet Town and Church Road, Ooregum. (Government Order No. 12038-9—L. B. 150-13-12, dated 1st June 1914.)

(ii) Laying water-supply pipes to the Chief Sanitary Inspector's quarters Rs. 69 with tools and establishment charges Rs. 12.

(iii) Annual maintenance charges of water supply to Robertsonpet (establishment) Rs. 345.

B. Public Works. Original and Repairs (executed by the Board).

The cost of works executed by the Board's Agency amounted to Rs. 14,616 and includes the following important works carried out during the year:—

	Rs.
(1) Completion of the Sanitary Board Office-building ...	730
(2) Roofing over platforms in the new market near Stevens' Camp ...	901
(3) Providing an additional gate to the same ..	81
(4) Constructing five additional platforms to the same ...	351

	Rs.
(5) Construction of four latrines in Masikam and zinc huts in Ooregam village ...	950
(6) Construction of cisterns in Masikam B Block Cooly Colony ...	230
(7) Cuddapah slab flooring the court-yard of salt fish stalls in Robertsonpet Market ...	214
(8) Constructing a surface drain to lead off sewage water from the new Maternity Hospital at Robertsonpet ...	1,032
(Note Total cost incurred for this work during the year was ... of which Rs. 1,293 was debited to Provincial Funds.)	2,325
(9) Construction of a cattle-pound at Ghatkamadenhalli ...	244
(10) Improving Irish drain and constructing a tunnel in Ooregam Village Road. ...	486
(11) Construction of quarters for the Circle Sanitary Inspector at Dodvalagamadi ...	1,094

The total expenditure incurred under the head was Rs. 4,280 or Rs. 839 more than in the previous year. The net excess expenditure of Rs. 839 was only nominal as it was the result of the transfer of the cost of Rent Collection Establishment and Contingent Charges thereunder to this head from "D 6 a.b." to which it was being originally debited.

Rupees one hundred and fifty-seven was paid towards the collection of House and Mohatarfa Taxes at Robertsonpet Town for the year 1912-13. (Sanctioned in Government Order No. 2364-6—L. B. 83-12-2, dated 19th September 1912.)

The charges under this head aggregated Rs. 41,372 against Rs. 49,577 in 1912-13, with a net saving of Rs. 8,205 during the year for reasons explained below. During the year under report, a sum of Rs. 1,550 being the moiety of cost was paid by the Board for the purchase of beddings and clothing and other furniture for the full equipment of the new Maternity Hospital at Robertsonpet, and some conservancy carts and other sanitary implements were purchased at a cost of Rs. 513.

The enhanced rate of power from Re. 0-0-6 to Re. 0-1-0 per unit for street lighting by electricity increased the expenditure under "Lighting Charges" by Rs. 939. (Government Order No. 3106-9—L. B. 214-12-3, dated 30th August 1913.)

Chemicals and other apparatus were purchased for the Bacteriological Laboratory at Robertsonpet at a cost of Rs. 1,387. (Government Order No. 3322-4—L. B. 24-13-2, dated 6th September 1913.)

The increased expenditure under these and other minor heads, with a large saving effected under the improvements to the Maternity Hospital and plague, cholera and other epidemic charges, resulted in a net decrease of expenditure by Rs. 8,205 under this major head.

Vital Statistics.

There were 3,311 births and 2,426 deaths during the year against 2,698 births and 2,991 deaths in the previous year. The fall in mortality by 565 deaths was the result of small-pox and plague prevailing in a milder form during the year than in the previous year.

Plague.

There was a recrudescence of plague in Robertsonpet, Ooregam Village and Cooly Colony and other outlying villages which accounted for 150 deaths, while in the mining area there were 21 deaths from the same cause.

In Robertsonpet, Ooregam Village and Cooly Colony, there were 34 cases with 26 deaths and 49 cases and 40 deaths respectively.

There were a few sporadic cases of small-pox accounting for 12 deaths against 104 in the previous year, and the Field remained totally free from cholera during the year.

Dysentery and diarrhoea claimed 280 deaths, and respiratory diseases, including snake-bite, etc., carried away 110 victims, while there were 1,666 deaths from other causes.

One hundred and forty-seven plague and small-pox patients were admitted and treated in this hospital, and the cost incurred during the year amounted to Rs. 4,809.

Infectious Diseases Hospital.

Water-Supply.

Two wells in Peddapalli and Badamakanahalli villages in the Sanitary Board area, were improved at a cost of Rs. 64 and 113, respectively, and the well at Peddapalli repaired for Rs. 124.

Robertsonpet continued to be supplied with Bethamangala tank water as usual. The entire cost of pumping water from the tank together with the establishment charges estimated at Rs. 4,966 and sanctioned in Government Order No. 460-3—L. R. 50-14-2, dated 10th July 1914, has not yet been debited in the Board's account, only a portion of it, viz., Rs. 357 having been adjusted up to the end of March 1914.

Vaccination.

The total number of persons vaccinated during the year was 5,933 against 11,325 in the previous year, of which primary vaccination numbered 4,538, and re-vaccination 1,395. The percentage of successful cases to the total number vaccinated was 96.23 in the case of preliminary vaccination, and 78.85 in the case of re-vaccination.

A sum of Rs. 329 was incurred to meet the pay of the two temporary vaccinators maintained by the Board.

Inoculation and Rat Destruction.

Five hundred and thirty-six persons were inoculated during the year. The number of rats destroyed was 14,627 in the Sanitary Board area and 31,472 in the Mining area as against 27,978 and 22,299 respectively in the previous year.

Shop Licenses.

Five hundred and ninety applications for licensing shops and stalls for the sale of articles of human consumption were received; 474 were granted and 116 rejected on sanitary grounds during the year.

Licenses for building or repairing houses etc., were granted in 263 cases and refused in 34 cases, the balance left undisposed at the close of the year being 64.

Breach of Sanitary Rules.

Forty-seven persons were prosecuted under the Sanitary Bye-Laws, 26 of whom were convicted with a fine of Rs. 96-12-0 and 2 cases involving 2 persons were struck off and 19 discharged or acquitted.

The fines realised were as usual credited to Law and Justice and the question of crediting these realizations to the funds of the Board is still pending disposal by Government.

Maternity Hospital.

The required alterations and additions to the Maternity Hospital at Robertsonpet have been completed, and the hospital has also been equipped with furniture and is ready for occupation.

Rules and Bye-Laws.

New Rules for the regulation and control of public conveyance, framed under Section 5 of the Mysore Public Conveyance Regulation, VII of 1911, (Government Order No. 4044—L. B. 330-11-5, dated 2nd October 1913) came into force during the year under report, and the amended rules for the sanitation of Robertsonpet market and the amendments sanctioned to the conditions regulating the lease of the said market were given effect to during the year. (Government Order No. 3890—L. B. 57-12-2, dated 24th September 1913.)

The question of the revision of licenses fees for stalls and shops for selling food stuffs and other articles of human consumption and the levy of such fees on certain other articles has been submitted for sanction of Government.

Government Order No. 794—L. B. 182-12-8, dated the 19th July 1913, ordering the levy of double fines on cattle trespassing in certain villages under the Cattle Trespass Act, has been given effect to and enforced.

Lighting.

During the year under report, an estimate for Rs. 6,760 for extending street lighting by electricity to Robertsonpet Town and Church Road, Ooregun, was-sanctioned by Government, and a sum of Rs. 5,000 has already been placed at the disposal of the Chief Electrical Engineer to expedite the work.

BANGALORE,
19th November 1914.

W. F. SMEETH,
Chief Inspector of Mines.

APPENDIX

REPORT ON THE CAGE ACCIDENT WHICH OCCURRED AT EDGAR'S SHAFT, MYSORE GOLD MINE, ON THE 21ST AUGUST 1913.

An account of the accident is given in the Report of the Committee of Enquiry which is attached to this Report as Enclosure I.

In the Government Order No. 1407, dated 13th December 1913, on the Committee's Report it was directed that a further technical enquiry should be made dealing with the following questions:—

(1) The causes of the fracture of the adjusting link and whether the fracture was due to defective design or material or to improper use.

(2) The suitability of the clutch as a whole, of which the fractured link formed a part, for the purposes for which it is employed in connection with the winding of men in shafts.

(3) The efficiency of the brakes fitted to the Engine and whether it is desirable or possible to make them more powerful or more effective.

(4) Whether it is not possible to introduce safety catches for the cages in such shafts.

(5) What further precautions may be taken to minimize the possibility of such accidents.

The information which has been obtained during this enquiry is recorded below.

On several important points arising out of the accident Mr. J. A. Vaughan, Chief Inspector of Machinery, Union of South Africa, was consulted with the permission of the Government Mining Engineer and has kindly furnished his opinion. The Chief Engineers of the Mysore and Champion Reef Mines, the London Managers of the Mining Companies, the makers of the clutch and the makers of the winding engine have also been consulted on various points and their opinions are recorded below under appropriate headings.

I. THE CLUTCH.

The clutch, of which the fracture of the eye-bolt or link was the immediate cause of the accident, is of the friction-band type. A sketch of this clutch is shown in Fig. 1 (Plate I) in which C is the steel friction-band lined with blocks of wood W. This band grips a steel ring R which is attached to the side of the reel on which the flat winding rope is wound. The arrows show the direction of rotation of the reel and the travel of the rope for a descending cage as at the time of the accident.

The engine shaft S carries a heavy boss B, securely keyed to it, which is expanded into a circular disc D the periphery of which carries a number of rollers which prevent the band C from springing too far away from the ring R when the clutch is released.

The band C is held at one end by the eye-bolt E which is connected by a pin to a support A firmly bolted to the disc D.

The other end of C is connected to a bent lever L the fulcrum of which is fixed to the disc D and which is actuated by a toggle T pivoted to a slip ring. This slip ring can be forced to and fro along the boss B by means of a hand wheel, screw and train of levers. When the slip ring is forced towards the reel, the toggle T is pushed into a more erect position thereby raising the end of the lever L and tightening the band C. The nuts on E are adjusted so that the band C is tight on R when the toggle T has an inclination of 77° from the horizontal. The action of the clutch is obvious. When the band C is tightened so that there is no slipping,

the band and the ring R must move together as one piece and consequently the reel and the engine shaft must move together or, in other words, the reel is made fast to the engine shaft and moves with it. When the band C is loosened by moving the slip ring outwards, the ring R and the reel to which it is attached is freed from contact with the band C and the reel and engine shaft can therefore revolve independently of one another.

The connection between the reel and the engine shaft depends therefore on the friction band being made sufficiently tight and upon its remaining so.

It is obvious that it will fail to remain tight if any portion of the band itself or if the lever or eye-bolt should break in which case the reel would become entirely detached from the engine and capable of revolving freely without any control except such as is afforded by brakes attached to the reel itself. In the present instance, the eye-bolt E snapped in two while winding was going on and although the engine was promptly stopped the reel continued to revolve, and the cage attached to the rope continued to descend in spite of the application of the brakes acting on the periphery of the reel itself.

The first point for investigation is the strength of the eye-bolt and the stresses to which it is subjected. Fig. 2 shows an enlarged view of the broken bolt; it will be seen that the fracture occurred close to the eye at one of the V shaped threads. It is a forging of mild steel, the bolt itself being $3\frac{1}{8}$ th inches in diameter at the bottom of the threads. The breaking weight at the point of fracture was estimated at 230 tons. An actual test of the corresponding eye-bolt on the north reel clutch gave a breaking stress of 33.11 tons or a total of 254 tons for a bolt $3\frac{1}{8}$ th inches in diameter.

This has to withstand the pull of the clutch band when it is tightened up as well as the stresses incidental to driving the load the greater part of which is effected through this eye-bolt as the connecting link between the reel and the engine shaft. The work is, of course, shared by the lever at the other end of the clutch band, but as this is less rigid than the former it will not participate so largely in kinetic shocks.

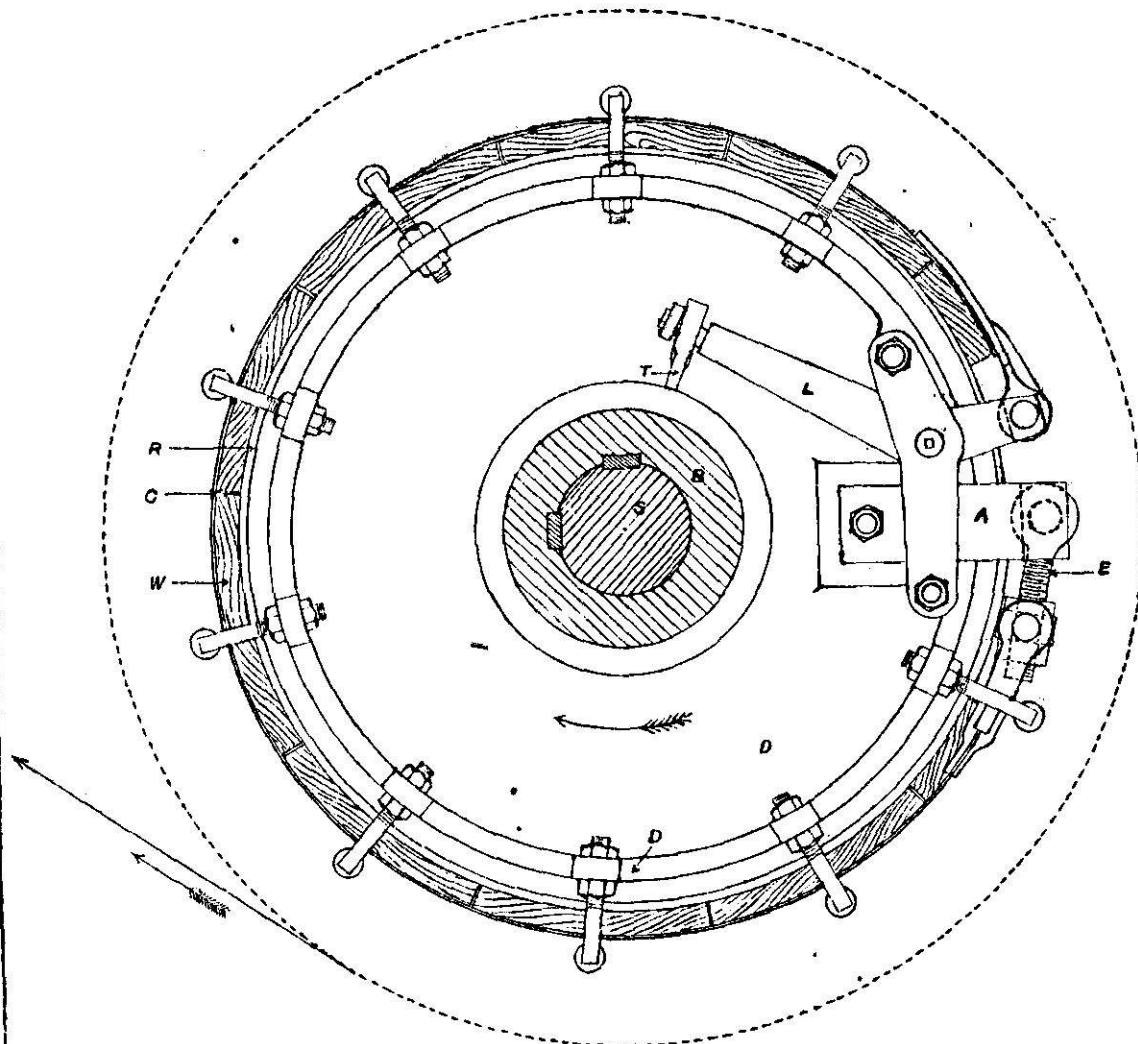
The pull of the clutch band is determined by the efforts of two coolies on a hand wheel and screw acting on the toggle through a system of levers. Mr. Paterson, Chief Engineer of the Mysore Mine, estimates that the pull thus put on the clutch band is 58.5 tons. Mr. Vaughan estimates the pull at about 65 tons (2,240 lbs.) allowing an efficiency of 32.6 per cent for the screw based on a co-efficient of friction of 0.15.

Taking Mr. Vaughan's figures as being the larger, this is equivalent to a tensile stress of 8.5 tons on the eye-bolt if the total pull on the clutch band is transmitted to the eye-bolt.

Mr. Vaughan points out that in addition to direct pull the eye-bolt may be subjected to bending stresses owing to heavy friction on the pin passing through the eye and he calculates that these may give rise to an additional stress of about 7.6 (long) tons on the outer fibres of the bolt and that this added to the pull on the band may raise the total stress to somewhere near the ultimate limit.

I am not clear myself as to how these bending stresses come into operation, but accepting Mr. Vaughan's figures the total stress on the outer fibres would be some 16 tons while according to the test made on the other eye-bolt the tensile strength of the steel was about 33 tons. This would give a factor of safety of 2, which, though it may be too low for safe working, indicates a considerable reserve of strength under the conditions suggested. It appears to me, however, that we are not entitled to assume that the pull of the lever is fully transmitted through the clutch band to the eye-bolt on account of the friction between the wood blocks of the band and the steel ring R. It is impossible to fully tighten the clutch with the hand wheel and after this has been screwed home the clutch band slips a little as soon as the load is taken up after which the hand wheel can be screwed down a little farther. During this slipping, a proportion of the pull of the lever L on the band is transmitted to the eye-bolt, but I do not think that even then the pull on the eye-bolt rises to anything near the pull on the other end of the band.

In connection with this point, the following test was made with the corresponding eye-bolt on the north drum of the engine, the eye-bolt in question having been in use for the same period as the bolt which broke.



Scale $\frac{1}{2}'' = 1'$

Fig. 1

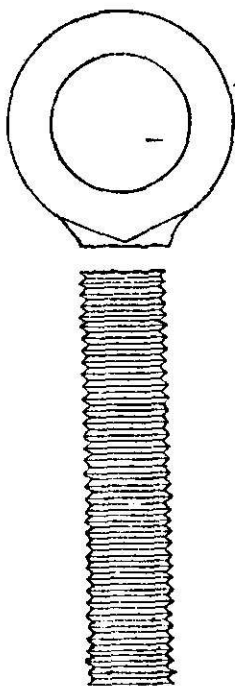


Fig. 2

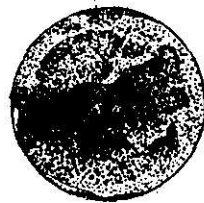


Fig. 4
(NATURAL SIZE)

Scale $\frac{1}{2}'' = 1'$

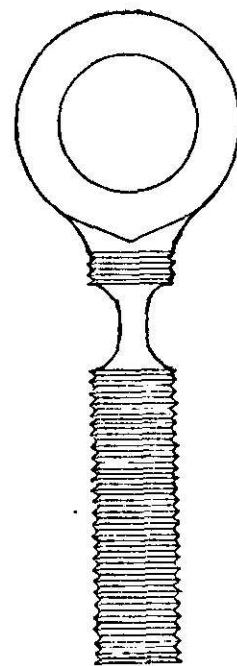


Fig. 3

A portion of the eye-bolt on the north drum was turned down—as shown in Fig. 3—in order to weaken it.

The bolt was then replaced, the clutch band fully tightened with the toggle at its working position of 77° . Two men at the hand wheel tightened it and jerked it as far as they could in the endeavour to break the weakened bolt. The whole rope was housed on the reel and steam turned on full and as soon as the reel was revolving at 60 revolutions the brakes were thrown on suddenly (acting through a cataract) and notwithstanding that the steam remained on the reel was brought to rest every time within some 3 revolutions, practically the whole of the retardation taking place within the last half revolution. This was a fairly severe test as the weakened eye-bolt had to stand not only the strain of the clutch band but the strain due to rapid retardation of the reel against steam. Mr. Vaughan suggests that steam may not have been full on as it would not take full steam to run the reel at 60 revolutions. I am unable to say definitely that this was the case but, at any rate, we may take it that the eye-bolt was subjected to a considerable strain in addition to that due to the tightening of the band by forcible urging of the hand wheel.

In each test, the engine was run backwards and forwards several times and the brakes applied.

The results of the tests were as follows:—

1st test	...	Eye-bolt turned down to 2" diameter	...	No effect produced.
2nd test	...	Eye-bolt turned down to $1\frac{3}{4}$ " diameter	...	No effect produced.
3rd test	...	Eye-bolt turned down to $1\frac{1}{2}$ " diameter	...	After test the reduced part showed a longitudinal crack.
4th test	...	Eye-bolt turned down to $1\frac{3}{8}$ " diameter	...	A small portion of metal alongside the crack came out.
5th test	...	Eye-bolt turned down to $1\frac{1}{4}$ " diameter.		

The crack disappeared entirely; after the test the diameter of the reduced portion was found to be $1\frac{1}{8}$ " with an elongation of $\frac{5}{8}$ " and the crack opened out considerably. Even then we were unable to break the test piece.

The eye-bolt was then removed and broken by a direct pull in a testing machine. It broke at 33.11 tons. In the centre of the test piece there was found to be a flaw or cavity about 5 inches in length and of section shown in Figure 4. Allowing for this, the area of the test piece was just about 1 square inch which gives a breaking stress for the metal of 33.11 tons. The fracture was finely granular or crystalline, very similar to the fracture of the broken eye-bolt of the south reel.

This test appears to afford conclusive evidence that the strain which can be put upon the eye-bolt by tightening the clutch is only a fraction of that put upon the other end of the clutch band by the bent lever, even when the hand wheel is violently jerked which is not the case in ordinary working.

Further, the strains due to sudden retardation by the brakes against steam were probably as great as those due to acceleration of the load during actual working and yet these strains combined with the pull of the clutch band did not amount to 33 tons as against the 254 tons estimated breaking strength of the original eye-bolt.

It would seem therefore that under the conditions of the accident the eye-bolt would have had a factor of safety of at least 7 or 8 and as there was no flaw in the eye-bolt which broke, nor signs of deterioration, the fact of its failure appears to me to be quite unexplained.

Although there is no evidence to show that anything untoward or exceptional occurred at the time of the accident, it is worth while to consider whether any conditions might occur in which the eye-bolt would be subjected to much more violent stresses than those which have been indicated as probable during the progress of ordinary work.

So long as the clutch band remains tight without any slipping it does not seem possible for the stress on the eye-bolt to increase very much above that indicated by the abovementioned experiments even if we allow for sudden acceleration due to bad driving. Mr. Vaughan mentions a case in which the eye-bolt had been made so tight on its bearing (by means of adjusting nuts) as to become practically a fixture with the result that bending stresses became sufficiently intense to

cause fracture. In the Mysore case, there are no such adjusting nuts and the bending stresses can be only those due to friction in the bearing and with the comparatively low total pull on the bolt, as indicated by the experimental tests, these stresses will not be very important.

There is however one case, and so far as I can see only one, in which the pull on the eye-bolt might become very largely increased. It will be remembered that immediately before the accident the south clutch had been thrown out and the north cage raised to another level. Supposing that before commencing the downward trip the south clutch had not been put on sufficiently tightly to prevent slipping under the pull of the descending cage, the following events might occur.

Steam would be put on to raise the north cage and the brakes taken off both reels. In a revolution or two it would be noticed that the south reel was gaining undue velocity and slipping through the clutch. Steam would then be cut off and the brakes applied in which case the north cage and the engine shaft would come to rest within a revolution or so but the south cage would continue to descend even against the brakes which, as will be shown later and as demonstrated by the accident itself, were not sufficiently powerful to arrest the descending cage with the reel unclutched. As soon as this was realized it is only natural to suppose that the next act would be to hurriedly tighten the hand wheel with the result that the clutch band, now stationary along with the engine shaft, would bite fiercely on the revolving ring of the reel with the result that an enormous shock would be given to the eye-bolt and the end of the clutch band attached to it owing to the momentum of the rapidly moving cage rope and reel. It is evident that such a shock would give rise to stresses far in excess of any that could be produced during working with a tight clutch and might easily exceed the ultimate strength of the eye-bolt.

Taking the ultimate strength of the clutch band at 187 tons, as calculated, and that of the eye-bolt at 254 tons, it may be asked why the latter should give way and not the former. We have of course the fact that such was the case and if we allow that the material of the eye-bolt was in good condition and unflawed we have to account for its failure in preference to the failure of the clutch band.

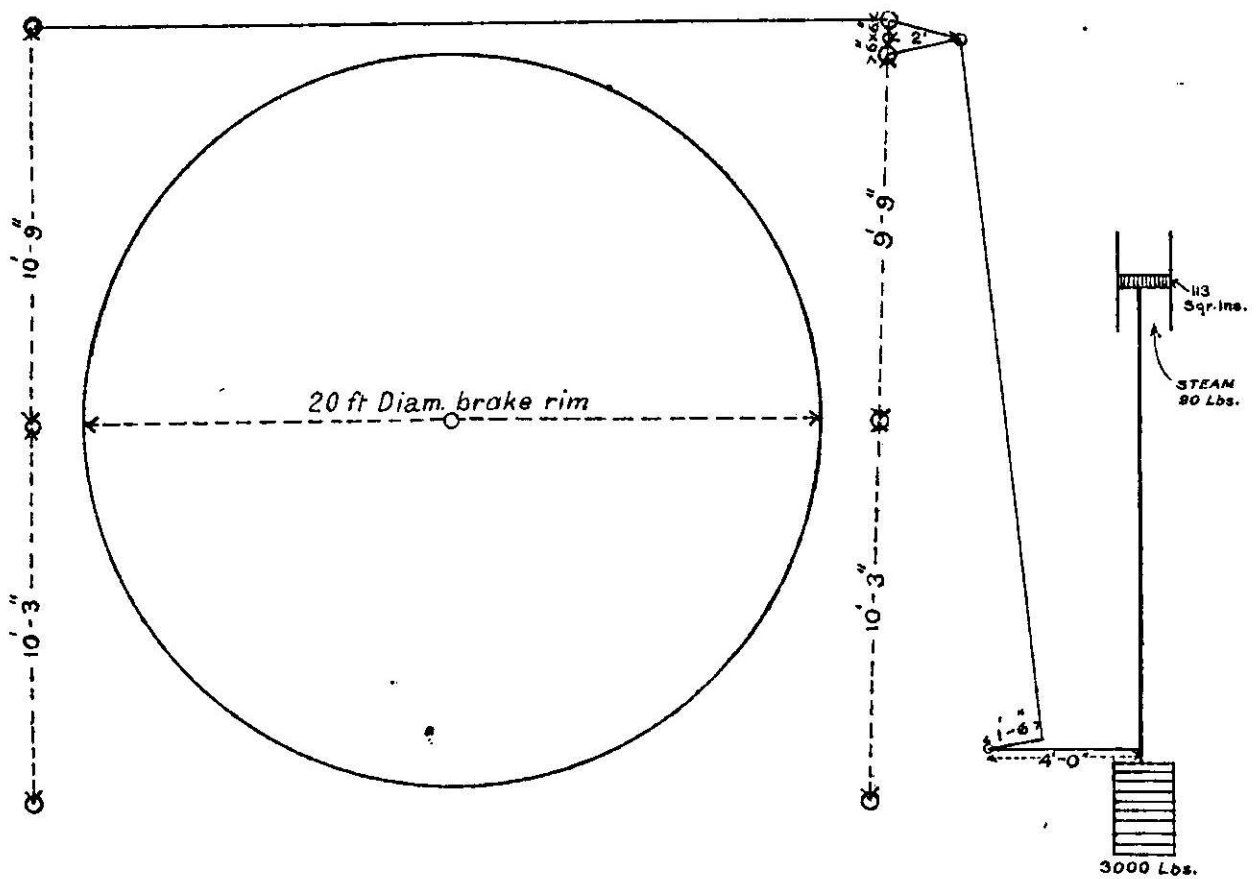
Taking Mr. Vaughan's figures in which the pull on the eye-bolt was assumed at 65 tons, giving a stress of 8.5 tons due to direct pull and an additional 7.6 tons on the upper fibres due to bending or a total of 16.1 tons on those fibres, it will be seen that if the total pull is about doubled the stress on the upper fibres will rise to the ultimate limit of 33 tons. Under these conditions, a total pull of 140 tons or so would be sufficient to fracture the eye-bolt while some 187 tons or so would be required to break the clutch band.

In this way, it seems possible to account for a sudden pull on the eye-bolt which would be very much in excess of anything obtainable under normal conditions of working and of sufficient magnitude to fracture a sound eye-bolt as well as explaining why the bolt should have given way in preference to the weaker clutch band.

This suggested explanation is put forward in the face of the difficulty of explaining the fracture of the bolt under normal conditions of work although no evidence has been forthcoming to support it and the statements of those present are opposed to any suggestion of the clutch having been insufficiently tightened. Apart from this academic suggestion which I have put forward, the fracture of the eye-bolt appears to me to remain unexplained.

Suitability of the Clutch for Winding Men.—In view of the serious nature of this accident, the question of the suitability of this form of clutch for winding men naturally arises. The eye-bolt appears to have been suitably designed and of good material and ample strength for all normal conditions and yet it failed and caused great loss of life. On a similar clutch in the Champion Reef Mine, the bent lever which tightens the clutch band broke owing to a flaw in the casting. This released the drum, but the skip was stopped by the brakes. On another occasion, the eye plate by which the clutch band is attached to the bent lever developed a crack which was detected and the plate replaced by another which again developed a crack. Fortunately, these cracks were detected before the plate fractured completely.

DIAGRAM OF
EDGAR'S REEL-ENGINE BRAKE.



Mr. Vaughan to whom these points were submitted is not of opinion that the clutch should be prohibited though he would prefer a multiple tooth clutch for deep level winding.

To reduce the chance of accident with the friction clutch, he suggests the following steps:—

- (a) Bolt up one clutch, and only use one free drum or reel.
- (b) Make the thread of the eye-bolt round instead of V shaped.
- (c) Turn off all thread from the eye-bolt except that which is required; the "Edgar's" bolt, threaded right up to the head, was not the best form.
- (d) Alter the leverage, so that the maximum possible pull on the eye-bolt is reduced to only a little more than is necessary to prevent the clutch slipping *viz.*, about 25 tons, at a co-efficient of 0.5. In this connection, it may be advisable to line the band with "Ferodo", which material certainly increases the co-efficient of standing friction.
- (e) Regularly anneal the eye-bolt.

The Chief Engineers of the Mysore and Champion Reef Mines point to the large number of trips which have been made without accident and to the great convenience of the clutch where many levels are being worked.

The makers of the clutch suggest very similar precautions to those suggested by Mr. Vaughan with the addition that the parts subjected to strain and shock should be made of the best iron instead of steel and spares kept in stock to permit of regular annealing.

With attention to the precautions suggested there is little doubt that the security of the clutch would be much enhanced, but nevertheless I am not in favour of these clutches being retained in cases where men are wound and the moving masses so large as to require great braking power in case of a failure. My objections rest on the ground that the clutch mechanism involves a number of single links or parts, such as the clutch band, the eye-bolt, the bent lever and the toggle lever, the failure of any one of which will completely release the reel or drum and may throw an amount of work on the brakes which they may be unable to take care of in time to avert an accident. On this account, it has been decided to do away with these clutches as soon as possible at Mysore and Champion Reef in cases where men are being wound and to replace them with special multiple tooth clutches in which provision has been made for a fine adjustment of the position of the cage at any level which is not usually possible in toothed clutches.

Temporary Measures.—The new clutches will take some time to procure and in the meantime the clutches of the Edgar's Shaft Engine have been securely bolted to the reels so that they are now entirely out of commission. At Carmichael's Shaft, Champion Reef Mine, one of the clutches has been bolted up and the other is very carefully watched. At this shaft, the brakes have already been proved sufficiently powerful to arrest a runaway load.

II. THE BRAKES.

These are of the ordinary post type lined with wood and acting on the brake-path attached to the periphery of the reel which has a diameter of 20 feet.

The brake is actuated by a weight of 3,000 lbs. acting at the end of a train of levers, the weight being taken off as required by steam. Plate II illustrates the action of the brake diagrammatically.

The accident shows clearly that the brake was inadequate to bring a runaway cage to rest and on this point the following remarks by Mr. Vaughan show that that result is in accordance with the results of mathematical investigation.

"Taking the total load on the reel as 15,640 lbs. at 9 feet 9 inches radius (reduced from 10 feet, as some rope has been unwound) the moment of 154,830 lbs. ft. is arrived at which gives a pull at the brake path—10 feet radius—of 15,483 lbs. The total brake pressure works out at 63,100 lbs., and, applying the co-efficient of 0.2, the effective pressure becomes 12,620 lbs.—considerably less than 15,483 lbs. The load would, there-

fore, be subject to acceleration, and the velocity of 1,200 feet would soon be much exceeded, especially so as the brakes could not be applied *immediately*, and one second delay means a great deal in this connection.

“During the descent of the cage the descending weight increased, but this increase would be more than compensated for by the decrease in radius of the winding reel, so that gradually the brakes would become more effective, except for the probable diminution in co-efficient of friction due to the charring of the wood blocks. It appears from the evidence that the final velocity was nothing like what would have been due to anything like ‘free fall’.

“From the point of view of safety, the brake is the most important unit of the winding equipment, but it is quite certain that in the past the designers of winding plant have figured on a co-efficient of friction largely in excess of that which actually obtains when a fair velocity is attained.”

This opinion was placed before the Superintendent of the Mine who referred it to the London Managers of the Company and they have furnished a complete investigation of the braking conditions. The calculations in connection with this investigation are given in Enclosure II and are based on the determination of the total braking torque necessary to prevent acceleration (static torque) and to bring the reel and suspended loads to rest in say 10 seconds (dynamic torque).

For calculation purposes it is assumed, as the most serious condition, that a broken clutch occurs with a loaded cage travelling downwards in the shaft and that the brake is applied when the reel is moving at 60 revolutions per minute—corresponding to the maximum speed of the engine. The point at which the most unfavourable conditions occur can best be determined by means of torque diagrams, since the static torque first increases and afterwards decreases with the depth of the cage in the shaft whereas the dynamic torque due to the moment of inertia of the moving masses decreases with depth.

The results of the investigation are stated as follows:—

“From the calculations and combined diagram of static and dynamic torques, it appears that the most unfavourable braking position for a clutch accident would be at a vertical depth of nearly 1,700 ft. with brakes applied to a cage of men descending at about 3,000 ft. p. min.

“At this point, the combined torque required to prevent acceleration and to bring the reel and cage to rest in 10 seconds is a maximum at about 253,500 ft. lbs. so that with a co-efficient of friction of 0.2 a braking pressure of 126,750 lbs. is required at 10 ft. radius of brake path.

“The present weight of 3,000 lbs. on the end of the brake lever produces a braking pressure of only 64,000 lbs. through the existing system of levers, and it is evident that this is quite insufficient to meet the conditions outlined above; in fact the weight should be doubled to 6,000 lbs.

“We understand that the makers originally supplied a double acting brake engine, with a view to using steam to assist the dead weight in case of emergency.

“With 120 lbs. per sq. inch steam pressure acting on a piston area of 113 sq. inches, the emergency braking effect would have been 13,550 lbs. in addition to the dead weight of 3,000 lbs. for normal manipulation. This would give a total braking pressure of 353,500 lbs. at 10 feet radius of brake path which is excessive, firstly because the brake gear parts are not strong enough to stand the very heavy pull and secondly the application of so large a torque might set up dangerous stresses in the rope.

“It seems probable that the Engineers on the Mine may for this reason have discarded the emergency steam braking arrangements provided.”

From information supplied by the Chief Engineer of the Mysore Mine, I find that at first direct steam was used on the piston of the brake engine at a pressure of 60 lbs. Owing to sticking of the D valves, the operation of the brake was found

to be difficult and irregular and the brake came into operation either late or so suddenly that the rope showed signs of surging and the effect was considered to be dangerous. In view of this, the D valves were replaced by piston valves similar to those employed on the skip engine which have always given satisfactory results. In this type, the steam is used only to lift the weights and release the brakes, the braking effect being accomplished by the dead weight only.

The Chief Engineer states that in his opinion the weight of 3,000 lbs. was considered to be ample but that the severe conditions which would arise from a failure of the clutch were not anticipated or provided for.

There is no doubt that a weight of 3,000 lbs. is sufficient for normal working and that with it the static test required in the Transvaal *viz.*, that the brake should be capable of holding up the cage when loaded to double its capacity with no more slipping than one foot, was duly provided for.

In this connection, I had a further test of this brake made after the accident, with the charred wood blocks still on just as at the time of the accident, with the following result.

The cage was loaded with 5 tons of bricks and lowered to the 7th level. It was then raised 6 feet and held by the brake. The clutch was then released and the reel slipped half an inch through the brakes. The brake therefore fully complied with the required test even after charring of the blocks. It may be mentioned however that it has been the custom at this mine to drill holes in the brake blocks and fill them with rosin and sand with the view of increasing the friction and that in consequence of this the co-efficient of friction may have been in excess of 0.2 and the conditions less unfavourable than shown by the above calculation.

The final conclusions on the question of the brake may be stated as follows:—

(a) The brake was inadequate to stop the runaway cage before it reached the bottom of the shaft as proved by the accident.

(b) The theoretical investigation shows that the brake is inadequate to bring the cage to rest in 10 seconds after the release of the clutch if travelling at its maximum speed of about 3,000 feet per minute.

(c) The static test which provides that the brake shall be capable of holding up the cage when loaded with double its maximum working load is insufficient provision for kinetic conditions which may arise in the event of the reel becoming free.

(d) It is difficult or impossible to insist on "runaway" tests the failure of which would probably wreck the shaft, but it seems necessary to insist that theoretical investigations should be made in the case of all large winding engines and provision made for the most serious emergencies within reasonable limits.

Steps taken to increase the Power of the Brakes.—Some assumption is necessary as to the brake power which should be provided for a winding engine of this character. The assumptions on which the calculations recorded above have been based appear to me to be reasonable and adequate. These are that the brake should be capable of bringing a fully loaded cage descending at a velocity of 3,000 feet per minute to rest within 10 seconds the drum or reel being free of the engine shaft. In the case of the Edgar's Engine this means increasing the weight which actuates the brake from 3,000 to 6,000 lbs. Had the larger weight been in operation at the time of the accident the descent of the cage would probably have been arrested before it reached the bottom of the shaft and loss of life consequently averted. Under some conditions, even a weight of 6,000 lbs. might prove insufficient to bring the cage to rest in time to avert a catastrophe, but it is not possible to go on increasing the weight indefinitely without running into danger in other directions. For instance, there is the danger of breaking some of the tie rods or other parts of the brake mechanism or of putting dangerous strains on the rope and its attachments or on the reel itself or other parts of the winding engine. Admitting that the weight of 3,000 lbs. was quite inadequate to arrest the cage under the comparatively mild conditions under which the accident is stated to have occurred, it becomes necessary to decide upon increasing this weight so as to provide sufficient power to take care of even more severe conditions within reasonable limits. It appears to me that the limits provided for by a weight of 6,000 lbs. are reasonably severe and might be adopted.

An investigation has been made as to the capability of the brake parts to withstand the action of such a weight and they are considered to be equal to the task. The Chief Engineer of the Mine has however expressed some doubt as to the reel itself, which carries the brake path, being capable of withstanding the strains which the increased pressure may put upon it and to guard against these the reel has been very considerably strengthened by the addition of a number of radial arms.

The dead weight has now been increased to 4,500 lbs. and the brake is working smoothly and satisfactorily and preparations have been made for increasing the weight to the full 6,000 lbs. before clutches are again installed.

It is of course necessary to state that at the present the clutches are bolted up and therefore out of commission and that the severe conditions on which the calculated weight of 6,000 lbs. has been arrived at are at present practically impossible of realization. It is desirable however to increase the weight gradually up to the maximum of 6,000 lbs. to permit of experience being obtained with the use of the more powerful brakes before the new clutches are installed.

III. SAFETY CATCHES.

Various forms of safety catches have been devised and used for the purpose of arresting the descent of a cage in the event of the rope breaking or becoming detached.

In the case of the Edgar's Shaft accident the rope did not break, but remained attached to the reel under considerable tension. Mr. Vaughan expresses the following opinion on this point:—

“I would premise that no safety catch with which I am acquainted would have been of any likely use in the accident at the Edgar's Shaft.

“The ‘Schewder’ safety catch is not being used in the Transvaal. The Mines Department has not insisted on the use of safety catches where steel guides are installed, and this may be one of the great reasons. Consulting Engineers have certainly not favoured the use of this device and the inventor himself, so far as I am aware, has ceased to push it”.

This opinion agrees with the opinions of Consulting Engineers generally and the practice at Edgar's Shaft of running the cages on steel guides without safety catches is in agreement with the existing practice elsewhere.

I have suggested the possibility of substituting large wooden guides backed with channel iron for steel guides and applying safety catches of the “Undeutsch” type to them. It would be possible in this way to use this type of catch which has been shown to possess great merit when applied to wooden guides, but the advisability of substituting wooden for steel guides is certainly problematical. The suggestion has however been placed before the Mining Board for consideration and will be discussed further.

IV. CONCLUSIONS.

(1) The failure of the eye-bolt of the clutch, which was the immediate cause of the accident, has not been in my opinion satisfactorily accounted for. The bolt appears to have been of excellent material and amply strong for the work expected of it. The fact that it failed suggests that it was subjected to some unusual and exceptionally violent shock as to the nature of which no evidence has been forthcoming.

(2) In cases where these clutches are retained the special precautions indicated by Mr. Vaughan and by the makers in regard to the substitution of the best iron for steel, the provision of spare parts and regular annealing should be attended to.

(3) The fact that the integrity of the clutch depends on a number of single links or parts, the failure of any one of which releases the clutch, renders the advisability of using this form of clutch for winding men somewhat questionable. On the Kolar Field, it has been decided to replace these clutches by others of the multiple tooth type in cases where men are being raised and lowered.

(4) The brakes in use on the Edgar's Engine were inadequate to bring the freely revolving reel and its attached cage to rest in time to avert a catastrophe. The prescribed static test was fully complied with but is obviously insufficient to guard against accident under the kinetic conditions involved in the event of a runaway reel. The possibility of the runaway owing to release of the clutch does not appear to have been contemplated by the Engineers of the Mine and sufficient braking power to deal with such an emergency was not provided for.

It is very desirable that the results of this investigation should be published and that the Superintendents of Mines should be requested to have the case of each winding engine specially investigated with a view to providing sufficient braking power to deal with exceptional contingencies within reasonable limits. The calculations for the Edgar's Engine, given above, are based on assumptions which may be regarded as reasonable and adequate, but which may possibly require some further technical consideration.

I am of opinion that the failure to provide the amount of brake power which has now been shown to be desirable for the Edgar's Engine was not due to any carelessness or negligence, but mainly to failure to recognize the possibility of certain exceptional and unexpected conditions arising. The very serious results of the accident have called attention to these possibilities and the lessons of this accident should lead to much closer attention being paid to such problems in future with a view to minimizing the chances of disaster.

(5) As regards the provisions of safety catches, no action is called for as the conditions at Edgar's Shaft are in accordance with the best practice at other mining centres. Further opinions will, however, be obtained as to the advisability or otherwise of using special wooden runners in steel equipped shafts with a view to the employment of certain forms of safety catch which are applicable to wooden runners but not to steel guides.

MYSORE GEOLOGICAL DEPARTMENT,
Bangalore, 16th October 1914.

W. F. SMEETH,
Chief Inspector of Mines.

ENCLOSURE I.

Read—

The following report, dated the 27th September 1913, of the Committee appointed by Government in Proceedings (Geological) No. 580-7, dated the 29th August 1913, to enquire into the circumstances of the fatal accident due to the fall of a cage in Edgar's Shaft, Mysore Mine, on the 21st August 1913.

REPORT.

The following are the members of the Committee :—

Mr. Justice Wallace, I.C.S.	(Chairman)
Dr. W. F. Smeth, M.A., D.Sc., A.R.S.M., etc., Chief Inspector of Mines in Mysore	} (Members)
Mr. C. Srikanteswara Aiyar, B.A., B.L., Inspector-General of Police in Mysore	
Mr. Guy. Ll. Taylor, A.M.I.M.M., Chief Engineer of the Ooregum Gold Mining Company	

At the first meeting of the Committee Mr. Justice Wallace was elected Chairman.

I.—PROGRAMME.

September 4th.—Committee assembled at the Mysore Mine and spent the afternoon inspecting the winding plant at Edgar's Shaft. The working of the engine, clutches, brakes, etc., was fully explained.

The Committee also inspected the cage which fell away and which had been taken to pieces underground and brought to surface piecemeal. The skip engine at Edgar's Shaft was also inspected while at work; the engine is fitted with similar clutches and brakes to the cage engine.

September 5th.—The Committee met during the forenoon and afternoon and interviewed the following witnesses :—

Mr. G. A. Paterson, Chief Engineer, Mysore Mine.

Mr. W. Kendall, Assistant Engineer, Mysore Mine, in charge of the Edgar's Shaft Winding Plant.

J. Jenkins, Driver of the Winding Engine at the time of the accident.

John Richards, Timber Foreman, who was at the 3,220 plat in Edgar's Shaft when the cage fell.

Notes of the statements and replies of witnesses are given in the appendix hereto.

The portions of the broken link which caused the accident were examined and the opinions of Messrs. J. Richards and W. Phillips, Foremen Blacksmiths of the Mysore and Ooregum Mines, taken.

September 6th.—In the forenoon, the Committee met at the Inspector of Mines' Office and interviewed Mr. W. J. Clemo, Acting Chief Engineer, Champion Reef Mine, in regard to the clutch on the winding engine at Carmichael's Shaft.

The Committee then inspected the winding plant at Carmichael's Shaft and witnessed the operation of the clutch.

Subsequently, the Committee inspected a multiple tooth clutch at Bullen's Shaft, Ooregum Mine, and saw it operated.

In the afternoon, the Committee discussed the evidence and prepared a rough draft of their report which was subsequently completed and circulated for confirmation.

II. BRIEF ACCOUNT OF THE ACCIDENT.

About 7 A.M. on the morning of the 21st August 1913, the south cage in Edgar's Shaft, Mysore Mine, fell from 100 feet below surface to the bottom of the shaft, a distance of 2,600 feet. The cage has two compartments one above the other in each

of which 25 men are permitted to travel. At the time of the accident there were altogether 42 persons in the cage, *viz.*, 6 Italians, 2 Eurasians and 34 Natives, all of whom appear to have been killed instantaneously when the cage reached the bottom of the shaft. When the cage fell away, at 100 feet from surface, it was on the downward trip and travelling at some 1,200 feet per minute.

2. Edgar's Shaft is a vertical circular shaft which was completed and equipped some two years ago. The cages run up and down on steel guides without safety catches.

3. There are two cages, one of which ascends as the other descends, each cage being suspended by a flat steel rope passing over a pulley at the top of the head-gear and led from thence into the engine room where it is coiled round a flat drum or reel twenty feet in diameter. Each reel is mounted on the main engine shaft, but is not rigidly fixed to the latter. While winding is going on the reel is secured to the main shaft by means of a clutch which in the present engine is in the form of a steel band, lined with wood, acting on a drum—very like a band brake. One end of this steel band is attached to a fixing on the shaft through an "adjusting link" for taking up wear and regulating the grip of the clutch band. The accident was due to the snapping of this link which released the clutch and left the reel, on which the winding rope is coiled, free to revolve on the shaft and therefore disconnected from the engine.

4. The link which snapped is in the form of a bolt $3\frac{3}{4}$ inches in diameter and about two feet long, made of mild steel. The fracture was perfectly clean and fresh and showed no appearance of any flaw or old fracture.

5. Each reel is provided with a very powerful post brake for the purpose of controlling the rotation of the reel, whether the latter is clutched to the shaft or not under ordinary working conditions and the brakes are in constant use every day. At the moment when the link snapped and the south reel became declutched from the main engine shaft, the south cage, carrying 42 men, was 100 feet below surface and the north cage with 21 men in it was about 75 feet above the 2520 station (1,630 feet vertical), the former descending and the latter ascending. The engine driver (J. Jenkins) heard the snap of the link and without being able to recognize what had happened he immediately cut off steam and applied the two brakes. The promptness of this action is shown by the fact that the north cage was brought to rest 150 feet above its starting point (2520) so that it travelled only about 75 feet after the snap took place. In other words, after the snap was heard the engine driver cut off steam, applied the brakes and brought the north cage to rest within a space of a few seconds and the cage with its burden of 21 men remained suspended in the shaft for three hours or so until it was ascertained that it was safe to lower it again to the 2520 station. In this case, the weight of the cage, rope, etc., helped the brake to overcome the momentum of the moving masses.

6. In the case of the south cage which was descending, the whole work devolved upon the brake which failed to bring the reel and the cage to a standstill. The friction of the brake blocks on the brake drum of the reel was so great that the wooden brake blocks were charred and the engine room filled with smoke. The engine driver stuck to his post, though he could do nothing further, while the reel revolved in a cloud of smoke and after the cage had struck the bottom the rope continued to pay out until some 14 spare coils were unwound and finally the plate and bolts which attach the rope to the drum of the reel were torn off and disappeared through the window of the engine house.

III. POINTS CONSIDERED BY THE COMMITTEE.

The various points taken into consideration and the opinions of the Committee on each are recorded below.

1. *The Suitability of the Winding Plant for the Work to be done.*—On a technical matter of this character the Committee are not prepared to offer any critical opinion. Ample evidence has however been produced to show that the plant has been carefully designed by experts and the designs carried out by responsible firms. From Mr. Paterson's statement (Appendix (i)) it will be seen that the engine was put in in 1904 and altered in 1911 when regular winding of men commenced.

In regard to the alterations made in 1911, when the present reels, brakes and clutches were put in, the whole question of the requirements for the shaft and winding plant was decided upon after exhaustive investigation by a Committee of Engineers and also by a Committee of Superintendents of the Mines.

In connection with the accident, three items call for special attention, viz., (a) the clutch, (b) the brakes and (c) the absence of safety catches from the cages. The opinion of the Committee on these is as follows:—

(a) *The Clutch.*—This is a device for securing the reel to the main engine shaft when winding is going on. The particular clutch used is of the friction-band type and was made by the Wellman-Seaver Head Company of London.

It is apparently of a well known standard design in use on such winding engines in many parts of the world and was supplied by the makers of the engine.

The clutch has been in constant use for the past two years and has given no trouble.

The link which fractured and caused the accident is in the form of a threaded steel bolt $3\frac{3}{8}$ inches in diameter and about 2 feet long. Mr. Paterson estimates the breaking strength of the link at about 230 tons and that of the clutch band to which the link is attached at 187 tons while the strain put upon these when the clutch is operated is estimated at between 58 and 59 tons. From these figures, the design appears to provide a large margin of safety and the Committee are unable to say why the link gave way. From the appearance of the fracture and from the opinions expressed by Engineers and Blacksmiths who examined it, the Committee are satisfied that there was no flaw or old crack which should have been detected and they are unable to say positively that the breaking of the link should have been foreseen or regarded as an event likely to occur.

(b) *The Brakes.*—The brakes, which are designed to bring the reel to rest and hold the cage at the various stopping places in the shaft under normal working conditions, are of the post brake type usually employed for large winding engines. The evidence before the Committee shows that they have proved satisfactory and effective hitherto for the work demanded of them.

The fact that the brakes on the south reel, which in the opinion of the Committee were promptly applied [see Section 5 (c)], were not sufficiently powerful to stop the descending cage after the reel had become declutched from the main engine shaft may be regarded as evidence that the brakes are not sufficiently powerful for abnormal emergencies. The Committee are unable to express any opinion on the technical question whether they might have been made sufficiently powerful to stop the descending cage, or whether it is possible to make them so with safety and are unable to assign any blame or responsibility to any one for the failure of the brakes to bring the cage to rest.

(c) *Safety Catches.*—These are devices intended to hold up the cage in the event of the rope breaking. When the shaft was equipped for winding men (in 1911), it was decided that no suitable or satisfactory catches could be obtained for working on the steel guides of this shaft and with this decision the Chief Inspector of Mines concurred. The Committee are satisfied that the absence of safety catches did not in any way contribute to the accident and that the provision of safety catches would not have prevented the falling of the cage down the shaft as the rope did not break.

2. *Condition of the Machinery at the Time of the Accident.*—The machinery appears to have been in good order and working properly up to the time of the accident.

3. *Inspections by Officers of the Mine.*—The mining rules provide that the brakes, rope, shackle and all other parts of the winding gear shall be examined once in every 24 hours, and the external parts of the winding engine once a week, by a competent person specially appointed for the purpose.

Mr. W. Kendall, Assistant Engineer, is the person appointed to carry out these inspections of the Edgar's Shaft winding plant and he testified to having carried out these duties regularly and produced the book in which the result of every such inspection is recorded under his signature.

In addition to this, Mr. Paterson, the Chief Engineer of the Mine, informed the Committee that he paid frequent visits to the engine room and made an official inspection of the plant once a week.

According to these officers, the machinery was in good working order.

4. *Government Inspection.*—The mining rules, which have lately been revised, provide that before any winding plant is used for raising and lowering persons the permission of an Inspector of Mines must be obtained; such permission being given only after the Inspector has satisfied himself that the provisions of the rules have been duly and reasonably complied with and that the condition of the plant, etc., is satisfactory. Mr. L. H. Beckwith, Officiating Inspector of Mines, produced the necessary papers to show that the required permission had been granted by Mr. R. Bocquet, Officiating Chief Inspector of Mines, in 1911 when the equipment of the shaft for raising and lowering persons was completed.

Dr. W. F. Smeeth, Chief Inspector of Mines, informed the Committee that he had inspected this plant on several occasions and had been perfectly satisfied with its condition and performance. He pointed out however that such inspections are essentially of a purely formal character as the Inspectors of Mines have neither the time nor the qualifications for conducting critical examinations and tests of the large mass of high class machinery now in use in the mines. Such examinations and tests demand the services of specially qualified Inspectors of Machinery and there are no such officers in Mysore. At present, these matters are, and must be, left to the Chief Engineers of the Mines and the experts of the firms who supply the plant.

From the foregoing the Committee are of opinion that the inspections required by the rules have been duly carried out, but that those carried out by the present official staff are of less value and utility than they might be owing to the lack of properly qualified and experienced machinery experts.

5. *Action of the Engine Driver at the Time of the Accident.*—The Engine Driver, J. Jenkins, bears an excellent character over a long period of service of which 16 years were spent at Collieries in South Wales and 9 years on the present engine at Edgar's Shaft. There can be no question as to his experience and competency.

The account given by him and recorded in the appendix as to what happened in the engine room is amply supported by circumstantial evidence. The chief points are the following:—

(a) The descending cage had gone down only a short distance—about 100 feet from surface—at the moment the link fractured.

(b) At that point the cage cannot have been travelling very fast. The driver's estimate of 1,200 feet per minute is a reasonable one and is about half the usual maximum speed of winding in this shaft.

(c) On hearing the noise caused by the fracture of the link, the driver shut off steam and put on the brakes with great promptness. This is shown by the position of the ascending cage which was brought to rest within 150 feet of its starting point and can have travelled only about 75 feet after the fracture occurred.

(d) The driver is supposed to test the brakes every day and adjust them when necessary. The brake on the north reel brought the ascending cage to rest and held it securely suspended in the shaft for some hours.

The brake on the south reel gripped sufficiently hard to char the wooden brake blocks and produce a large amount of smoke although the retarding effect was insufficient to bring the descending cage to rest. The facts that the cage was not severely crumpled after falling 2,600 feet and that the timber-foreman, John Richards, who was at a station in the shaft 2,100 feet from surface, does not appear to have been seriously impressed with the speed at which the falling cage passed him go to show that the cage was by no means falling freely and that the brakes were effecting a considerable retardation.

It is probable therefore that the brakes were in good working adjustment, but the Committee are not prepared to say whether the adjustment might or might not have been improved to an extent which would have brought the cage to a standstill.

Cage Accident

In the opinion of the Committee, the evidence all tends to show that the brakes were in proper adjustment and were promptly applied and no blame whatever can be attached to the driver on account of the fact that they were not sufficiently powerful to completely reduce the velocity and bring the cage to rest.

IV. CONCLUSIONS.

To summarize the report, the findings of the Committee are as follows :—

1. The machinery was carefully designed and constructed by experienced and responsible persons and has been kept in good working order.

2. The Committee are unable to give any explanation of the fracture of the link and find no reason to consider that it should have been anticipated. This, however, is a point which demands, and should receive, full technical enquiry.

3. The Committee are of opinion that no blame whatever attaches to the Engine Driver or other officials of the Mine. The Engine Driver acted with commendable promptness and thereby saved the ascending cage and its occupants from disaster.

4. The fracture of the link of this clutch and the facts disclosed before the Committee as to the failure of portions of other clutches of the same type impress on the Committee the necessity for closer official inspection of the machinery on the mines on which so many lives depend. They note that there is at present no official Inspector of Machinery with the experience and qualifications which would justify him in imposing advice on highly technical matters on Engineers of the ability and experience of those employed by the Mines and justify Government in putting on him the responsibility for the safety of the large working population of the mines and for the prevention, as far as experience and foresight can provide, of such accidents as the one under enquiry.

The Committee, without in any way questioning the experience or ability of the Engineers of the Mines, are of opinion that it would be advantageous to Government, to the Engineers of the Mining Companies and to the working population of the Mines, to have more expert official supervision of machinery than obtains at present.

The continuity of experience and co-ordination of results which would be secured by a properly qualified and responsible Government expert, whose time was primarily devoted to questions of safety, are probably not being sufficiently obtained under existing arrangements according to which such questions have to be left, very largely, to the discretion of the Engineers of individual mines.

APPENDIX.

Notes of statements and replies made by persons interviewed by the Committee.

(1) Mr. G. A. Paterson, Chief Engineer of the Mysore Mine.

The following details of the engine, cages and attachments were furnished:—

			Feet.
Depth of shaft (vertical)	...	...	2,700
Diameter of shaft (circular)	...	...	18 inside
Vertical depth 2520 station	...	...	1,630
" " 3226 "	...	...	2,108
" " No. 7 "	...	...	2,587
" " No. 8 "	...	...	2,661
Bottom	...	...	2,700
Size of reels—diameter	...	...	20 outside 8 inside
Size of ropes (flat)	...	...	4 $\frac{3}{4}$ " $\times$ $\frac{7}{8}$ "
Makers of ropes	...	...	Messrs. T. & W. Smith, Newcastle-on-Tyne.
Breaking strain of ropes	...	...	136 tons.
Weight of cage, rope and attachments	...	...	13 $\frac{1}{2}$ tons.
Weight on end of the rope when accident happened	...	...	About 7 $\frac{1}{2}$ tons.
Number of men sent down in 24 hours	...	...	" 3,000 men.
Number of trips in 24 hours	...	...	" 130.
Date on which engines were started	...	...	November 1904.
Date of alterations made to engines, two reels attached to them and regular working	...	...	May 30th, 1911.
Time engines have worked since alterations	...	...	2 years and 3 months.
Safety catches	...	...	See letter from Sandy-croft, Ltd. None known to be reliable.
Weight of 50 coolies	...	...	About 5,600 lbs.
Name of makers of engines who also supplied reels, brakes, etc.	...	...	Messrs. Thornewill and Warham, Burton-on-Trent.
Steam pressure at boilers	...	...	About 120 lbs. per square inch.
Size of engines	...	...	High Pressure Cylinder 30" diameter 6 feet stroke.
(Only high pressure cylinders in use at present.)			
Nominal horse power of engines	...	...	About 800 H. P.
Maximum rope speed	...	...	2,000 feet per minute.
Speed of cage when clutch broke	...	...	1,200 feet per minute.

A bell rings when the ascending cage is 200 feet from surface when the Engines are slowed up.

Drivers have worked the Engine for 9 years and are reliable.

This is the first accident that has happened since the engines started working on May 30th, 1911.

New ropes were put on March 3rd, 1913.

Engines were overhauled in March 1913.

Mr. W. Kendall is in charge of the Engines and visits them daily; a daily record book is kept for this purpose.

I have been Chief Engineer of the Mysore Mine for 6 $\frac{1}{2}$ years, previous to which I was Chief Engineer of the Ooregun Mine for 8 $\frac{1}{2}$ years and before that Chief Engineer of the Mysore Reefs for 11 $\frac{1}{2}$ years.

This Engine was put in in 1904, and was used for sinking the shaft with a single 24 feet drum.

When the shaft was completed it was necessary to put on double drums for the two cages and this was completed in 1911.

The responsibility for design rests partly with the Chief Engineer and partly with the makers.

The details as to depth, weight to be hoisted, speed of hoisting and type of machine to be used rest primarily with the Chief Engineer. The responsibility for design, efficiency and strength rests with the makers.

The alterations completed in 1911 were made while I was Chief Engineer and were decided upon after special investigations by a Committee of Engineers and by a Committee of Superintendents of the Mines. (The reports of these Committees were submitted for information.)

The clutches for the reels are of a friction type made by Messrs. Wellman Seaver Head & Co., London, and were supplied by the makers of the Engine.

I selected this particular type of clutch as I considered it particularly suitable for the work. I had no previous experience of it, but it is a well known make in use in many parts of the world for winding engines. The clutches have been in use for over two years and have been quite satisfactory. I have never known one of these links to break. The link appears to be amply strong enough. It is made of steel, $3\frac{3}{8}$ " in diameter, with a screw thread which reduces the diameter of the metal to $3\frac{1}{8}$ ". The fracture was quite clean and showed no signs of any flaw or old crack. I cannot say why it broke.

It is considerably stronger than the band of the clutch to which it is attached.

The breaking strain of the link is about 230 tons, that of the clutch band about 187 tons and the tension put upon the band and link when the clutch is put in is about 58.5 tons.

Similar clutches are in use on the skip engine at the same shaft. Shortly after starting, the band of one of these clutches cracked and the band was replaced since when we have had no trouble.

I do not know of any type of clutch which has not failed at some time or other. Naturally, I am not so satisfied with the present clutch as I was before the accident, but I do not consider it necessary to discard the clutch nor do I know of one to replace it which could be guaranteed never to fail.

Before putting the engine to work again the parts will be strengthened and other proposals for minimizing risk are under consideration.

The brakes on the reels are of the usual 'post' type and were supplied by the makers of the Engine. They have proved sufficient for all ordinary work. I do not know if any brake would have held the descending cage. The brakes were in good order and were put on immediately and acted properly. The friction on the brake of the south reel was sufficient to char the wooden brake blocks and fill the engine room with smoke.

The cage was not descending very rapidly; only about half the maximum pace at which winding is permitted which is about 2,000 feet per minute. This is not a high speed for modern winding engines.

There are no safety catches on the cages. No safety catch would have been of any use in this accident as the rope did not break.

The question of safety catches was most carefully considered when the shaft was equipped and it was decided that nothing satisfactory or reliable could be obtained.

The cages work on steel guides in the shaft.

The question of safety catches is still engaging attention and if a satisfactory device was forthcoming we should be very glad to put it in.

The Engine and all parts of the winding gear are inspected every day by Mr. Kendall, Assistant Engineer. I myself visit the engine room frequently and make an official inspection once a week.

Plans of the reels, brakes and clutches with their operating mechanism were submitted for inspection of the Committee.

(2) Mr. W. Kendall, Assistant Engineer of the Mysore Mine.

I have been an Engineer on this mine for the past 11 years. I was engaged on the erection of this engine in 1904. The clutches and the brakes have been working quite satisfactorily.

The adjusting link which broke was adjusted on August 2nd, about three weeks before the accident. I inspect this engine and all the winding gear every day. A record of every inspection is kept in a book provided for the purpose. (Book produced before the Committee and examined.)

The brakes are taken up regularly by the Engine Driver, as required, usually every 1 to 4 days.

I arrived in the engine room $\frac{1}{4}$ of an hour after the accident. There was smoke in the room and a good deal of charcoal on the floor from the charring of the brake on the south reel. I cannot say if the brake ought to hold a runaway cage; I doubt if it would do so if the cage was travelling fast.

It might be advisable to have two brakes on each reel—one to be used as an emergency brake only. I think the post brake is the best type.

(3) J. Jenkins, Driver, Edgar's Shaft Winding Engine.

I have had 9 years' experience on this engine.

Before that I had 16 years' experience on Colliery engines in the Ronda valley, South Wales, of which 11 were on hauling engines and 5 on winding engines.

On the day of the accident, I took over the engine at 7 A. M. and made two trips to the 3,226 level. I then unclutched the south reel and raised the north cage to the 2,520 level and put in clutch again, eased the brakes and tested grip of the clutch. I then started lowering a cage of men and when the south cage had gone down about 100 feet I heard a noise. I did not know what caused the noise but supposed it was due to the breaking of the link on the south clutch. I immediately cut off steam and applied the brakes full. The brakes are worked by two levers in front of me and if they are thrown forward the steam is released from the brake cylinders and allows weights to act on a series of levers which force on the brakes.

The amount of pressure on the brakes depends on the weights and I cannot increase the maximum amount of it.

When I put the hand levers forward the brakes acted at once and the north reel came to rest within one revolution and was held there by the brake. The south reel continued to revolve as the cage went down the shaft and the room was quickly filled with smoke from the friction of the brake blocks on it.

The reel continued to revolve until all the rope was unwound, the end of the rope being torn away from its attachment to the reel.

The brakes have been satisfactory and were in perfect order at the time. I always test the brakes every morning before starting work and if necessary adjust them.

The maximum speed of driving is between 50 and 60 revolutions a minute and at the time of the breakage she was going about 25 revolutions.

In the South Wales, men and coal are wound by the same engine and the speed of winding is often considerably greater than in Mysore.

(4) John Richards, Timber Foreman, Mysore Mine.

I was at the 3,226 plat (about 2,100 feet vertical) in Edgar's Shaft at the time of the accident.

I heard the cage coming down and looked round. The cage passed the plat quietly but very quickly. There were no lights in it and no sound from it.

It was travelling very fast, faster than when winding is going on, but I do not know that I should have been struck with the speed if I did not know that the cage should not come below 2,520 feet and that consequently something must have happened.

It was quite an appreciable time before I heard the noise of the cage striking on the gate at the 7th level 500 feet below me, but I could not say how long.

(5) Mr. W. J. Clemo, Acting Chief Engineer, Champion Reef Mine.

The winding engine at Carmichael's shaft, Champion Reef, is fitted with Wellman Seaver-Morgan friction clutches similar to those at Edgar's Shaft, Mysore. They have been in use 5½ years. The shaft is an incline shaft about 4,600 feet deep on the underlie which averages about 62°.

Between 4 and 5 years ago, the short arm of the lever which tightens the clutch band on the north drum broke owing to blowholes in the casting.

As far as I can remember the north skip was at surface at the time and the brakes were on the south drum but not on the north drum. The engine driver noticed the north drum revolving and immediately put on the brake which stopped the skip within 200 feet from surface. After that the levers of both clutches were replaced by levers of forged steel and have given no trouble since.

About 4 years ago, the eye plate bolted to the end of the clutch band on the south drum was found to be cracked on putting in the clutch and had to be replaced.

Two days ago, a similar crack was detected in the eye-plate on the north drum and the clutch has been put out of commission pending renewal.

I like the clutch and it is very suitable for this shaft where there are so many levels to be hauled from.

I have known a case of a multiple tooth clutch failing owing to the teeth being sheared off.

NO. 1407, DATED BANGALORE, 13TH DECEMBER 1913.

ORDER THEREON.—The Committee are of opinion that the accident is not traceable to negligence on the part of the mining employees concerned. The machinery appears to have been carefully designed and well looked after and, so far as could be ascertained by reasonably careful supervision, in good working order.

2. The fact that the brakes failed to arrest the cage and avert an accident would suggest either that they were not promptly applied or that they were not sufficiently powerful or effective to cope with an emergency of this character. In the opinion of the Committee, the Engine Driver acted with commendable promptness and did all that lay in his power to avert a catastrophe and in view of the circumstances under which the accident took place and the evidence recorded by the Committee, Government agree with this finding.

3. Having regard to the serious nature of the accident and the responsibilities involved in the winding of large numbers of men in these cages, Government recognise the necessity for every possible precaution being taken in regard to the safety of the appliances employed and agree with the Committee that a further technical enquiry is desirable as to the circumstances under which the accident took place. Such an enquiry has already been proposed by the Chief Inspector of Mines in his preliminary report, dated 23rd August 1913, and this enquiry is now in progress. The Chief Inspector of Mines is requested to submit a full report of the technical enquiry after any necessary consultation with special authorities on the technical issues involved. The enquiry should deal with the following questions:—

(1) The causes of the fracture of the adjusting link and whether the fracture was due to defective design or material or to improper use.

(2) The suitability of the clutch as a whole, of which the fractured link formed a part, for the purposes for which it is employed in connection with the winding of men in shafts.

(3) The efficiency of the brakes fitted to the Engine and whether it is desirable or possible to make them more powerful or more effective.

(4) Whether it is not possible to introduce safety catches for the cages in such shafts.

(5) What further precautions may be taken to minimize the possibility of such accidents.

4. The Committee incidentally observe that, though the Chief Engineers of the Mines are experts in machinery, the appointment of an official Inspector of Machinery will be of advantage; but as far as the present enquiry has gone, it seems that such an Inspector could have done very little in either preventing the fracture of the link or arresting the uncontrolled descent of the cage. Government will however be prepared to examine the question further in the light of such conclusions as may be arrived at during the technical enquiry.

5. The thanks of Government will be conveyed to the members of the Committee for their report.

W. F. SMEETH,
Secretary to Government,
Geological Department.

To—The Chief Inspector of Mines in Mysore.

ENCLOSURE II.

EDGAR'S SHAFT ENGINE.

Calculation of brake power necessary to bring a loaded cage to rest in 10 seconds with reel unclutched.

Weight of rope per foot	=	5.187 lbs.
Size of rope	=	$4\frac{3}{4}'' \times \frac{7}{8}''$.
Weight of cage attachments and men	=	15,640 lbs.
Radius of reel with no rope on = r	=	4 feet.
Speed = 60 r.p.m. = 6.28 radians per sec.		
Maximum weight of rope on reel	=	(3,900 — say 140) ft. $\times$ 5.187 = 19,500 lbs.

It follows that:—

$$\text{Weight of a c. ft. of rope} = \frac{5.187 \times 144}{4\frac{3}{4} \times \frac{7}{8}} = 180 \text{ lbs. p. c. ft.}$$

$$\begin{aligned} \text{Weight of rope wound on reel at any} \\ \text{outside radius } R = W_o &= \int_r^R 6.28 \, r \, dr \times 180 \times \frac{4\frac{3}{4}}{12} \\ &= 3.14 \times 180 \times .396 (R^2 - r^2) = 224R^2 - 3,580 \text{ lbs.} \end{aligned}$$

$$\text{Weight of rope suspended in shaft at} \\ \text{any outside radius } R = W_s = 19,500 - W_o.$$

$$\text{Weight of unreeled rope } W_u \text{ at any radius } R = W_s + 140 \times 5.187 = W_s + 720 \text{ lbs.}$$

$$\begin{aligned} \text{Moment of inertia of rope wound on reel} \\ \text{at any radius } R &= \int_r^R 6.28 \, r \, dr \times 180 \times .396 \times \frac{r^2}{32} \\ &= \frac{3.14 \times 180 \times .396}{2 \times 32} \{ R^4 - r^4 \} \\ &= 3.5R^4 - 895 \text{ lbs. ft. sec.}^2 \end{aligned}$$

$$\text{Moment of inertia of unreeled rope at} \\ \text{any radius } R = \frac{W_u \times R^2}{32} \text{ lbs. ft. sec.}^2$$

$$\text{Moment of inertia of men, cage and} \\ \text{attachments at any radius } R = \frac{15,640 \times R^2}{32} = 489R^2$$

$$\text{Moment of inertia calculated for reel,} \\ \text{angles arms and clutch rings} = 28,500 \text{ lbs. ft. sec.}^2$$

$$\text{Static torque to prevent acceleration} = (15,640 + W_s) R.$$

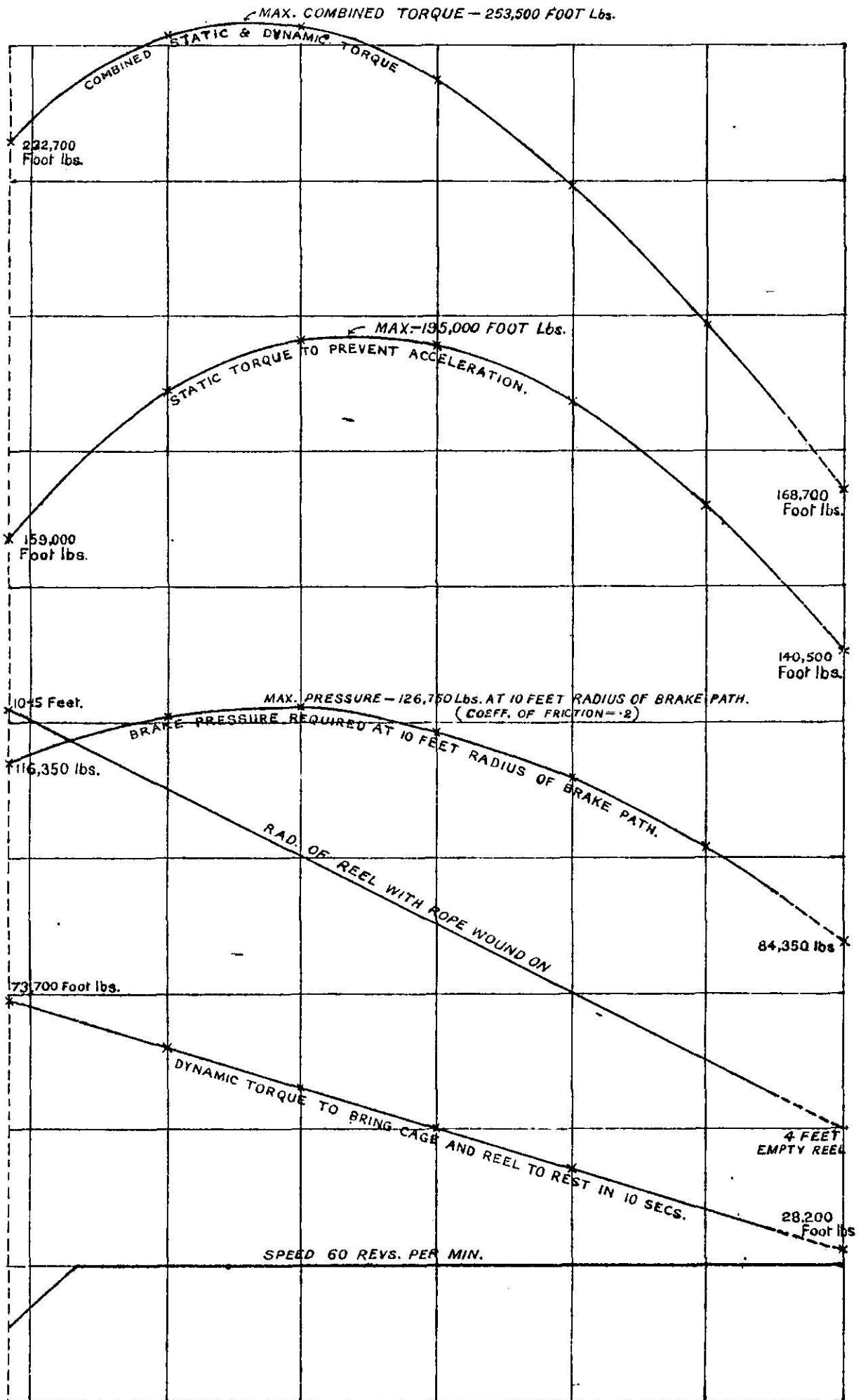
$$\text{Angular retardation to bring the system} \\ \text{to rest in 10 secs.} = \frac{6.28}{10} = .628 \text{ radians per sec.}^2$$

$$\begin{aligned} \text{Dynamic torque to bring system to rest in 10 sec.} &= \Sigma \text{ moments of inertia} \times .628 \\ &= I \times .628 \text{ lbs. ft. sec.}^2 \end{aligned}$$

$$\text{Total braking torque required} = \text{static torque} + \text{dynamic torque} = T \text{ ft. lbs.}$$

$$\begin{aligned} \text{Braking pressure in lbs. required at 10 ft. radius taking } .2 \text{ as the co-efficient of} \\ \text{friction} &= \frac{T}{2} \end{aligned}$$

DIAGRAMS OF EDGAR'S SHAFT REEL-ENGINE



Scale { Torque - 100,000 foot lbs to 4 inches.
Pressure - 100,000 lbs to 4 "
Rope Radius - 2 feet to 1 inch.

DIAGRAM CALCULATIONS.

Radius of reel R=	...	10'15 ft.	9 ft.	8 ft.	7 ft.	6 ft.	5 ft.	4 ft.
R^2	...	103	81	64	49	36	25	16
R^4	...	10,600	6,560	4,100	2,400	1,296	625	256
Wt. of rope on reel = W_o = $224R^2 - 3,580$ lbs.	...	19,500	14,550	10,740	7,400	4,470	2,020	0
Wt. of suspended rope = W_s = $19500 - W_o$ lbs.	...	0	4,950	8,760	12,100	15,030	17,480	19,500
Wt. of unreeled rope = W_u = $W_s + 720$	...	720	5,670	9,480	12,820	15,750	18,200	20,220
Moment of inertia of rope on reel = $3.5 R^4 - 895$ lbs. ft. sec ²	...	36,205	22,105	13,460	7,505	2,645	1,290	0
Moment of inertia of unreeled rope $\frac{W_u \times R^2}{32}$ lbs. ft. sec ²	...	2,320	14,350	19,000	19,650	17,700	14,200	10,100
Moment of inertia of men, cage and attachments = $489R^2$ lbs. ft. sec ²	...	50,300	39,600	31,300	24,000	17,600	12,200	7,820
Moment of inertia of reel	...	28,500	28,500	28,500	28,500	28,500	28,500	28,500
Σ Moments of inertia = I lbs. ft. sec ²	...	117,325	104,555	92,260	79,655	67,445	56,190	46,420
Dynamic torque = $I \times .628$ ft. lbs.	...	73,700	66,700	58,000	50,000	42,400	35,300	28,200
Static torque for rope suspended = $W_s \times R$ ft. lbs.	...	0	44,500	70,000	84,700	90,200	87,500	78,000
Static torque for men, cage and attachments = $15640 \times R$	...	159,000	141,000	125,000	109,500	94,000	78,200	62,500
Total static torque	...	159,000	185,500	195,000	194,200	184,200	165,700	140,500
Total static and dynamic torques	...	232,700	252,200	253,500 Max.	244,200	226,600	201,000	168,700
Braking pressure in lbs. re- quired at 10 ft. radius of brake path (coeff. of fric- tion = .2)	...	116,350	126,100	126,750 Max.	122,100	113,300	100,500	84,350

**STATEMENT OF CAPITAL EMPLOYED, ETC., IN GOLD MINES WORKING IN THE
1912**

NAME OF MINING COMPANY	Nominal Capital £ Stg.	SHARES			PAID-UP CAPITAL		DIVIDENDS PAID		Value of Bullion produced £ Stg.	ROYALTY PAID TO GOVERNMENT			Nominal Capital £ Stg.	Number issued				
		Number issued	Par Value, Shillings	December Prices	Per Share, Shillings	Total £ Stg.	Amount £ Stg.	Percentage of Paid-up Capital		At 5 per cent on the gross value of gold produced £ Stg.	At 2½ per cent on the dividends declared £ Stg.	Total £ Stg.						
A.																		
DIVIDEND PAYING.																		
The Mysore Gold Mining Company, Limited ..	305,000	610,000	10	5½	5½	10	305,000 0 0	381,250 0 0	125	904,070 9 9	45,203 10 6	9,531 5 0	54,734 15 6	305,000	610,000			
The Champion Reef Gold Mining Company of India, Limited	260,000	2,080,000	2/6	12/6	13/	2/6	260,000 0 0	(b) 130,000 0 0	50	508,997 3 2	25,449 17 2	3,250 0 0	28,699 17 2	260,000	2,080,000			
The Ooregum Gold Mining Company of India, Limited ...	Ord. 290,000	481,541	10	17/	18/	10	240,772 0 0	72,231 12 0	30	847,943 19 10	17,397 4 0	3,005 15 9	20,402 19 9	Ord. 290,000	481,544			
The Nundydroog Company, Limited	Pref. 120,000	240,000	10	1½	1½	10	120,000 0 0	48,000 0 0	40					Pref. 120,000	240,000			
	283,000	566,000	10	26/9	27/9	10	283,000 0 0	117,916 13 4	41½	330,937 14 7	16,546 17 9	2,947 18 4	19,494 16 1	283,000	566,000			
Total	1,258,000	3,977,544	...	...	...	...	1,308,772 0 0	749,398 5 4	61.99	2,091,949 7 4	104,597 9 5	18,734 19 1	123,332 8 6	1,258,000	3,977,544			
														Increase for 1913		...		
														Decrease for 1913		...		
B.																		
PRODUCING GOLD, BUT NOT PAYING DIVIDENDS.																		
The Balaghat Gold Mining Company, Limited	Ord. 212,600	212,600	20	2/6	3/6	20	212,600 0 0	.....	...	66,412 11 6	3,320 1 7	.....	3,320 12 7	Ord. 212,600	212,600			
	Pref. 95,400	95,400	20	½	¾	20	95,400 0 0							Pref. 95,400	95,400			
Total	308,000	308,000	...	...	...	...	308,000 0 0	.....	...	66,412 11 6	3,320 12 7	.....	3,320 12 7	308,000	308,000			
														Increase for 1913		...		
														Decrease for 1913		...		
C.																		
WORKING, BUT NOT PRODUCING GOLD.																		
			...	...	...	...			...									
Total	.....	.....	...	...	...	...	.....	.....	...	.....	.....	.....	.....	.....	.....			
Total of A, B & C	1,566,000	4,285,544	...	...	...	...	1,516,772 0 0	749,398 5 4	49.11	2,158,361 18 10	107,918 2 0	18,734 19 1	126,634 1 1	1,566,000	4,285,544			
														Increase for 1913		...		
														Decrease for 1913		...		

STATE OF MYSORE FOR THE YEARS 1912 AND 1913.

1913

Table 1.

SHARES			PAID-UP CAPITAL		DIVIDENDS PAID		Value of Bullion produced £ Stg.	ROYALTY PAID TO GOVERNMENT			Total dividends paid up to date £ Stg.	REMARKS
Per Value. Shillings	December Prices		Per Share. Shillings	Total £ Stg.	Amount £ Stg.	Percentage of Paid-up Capital		At 5 per cent on the gross value of gold produced £ Stg.	At 2½ per cent on the dividends declared £ Stg.	Total £ Stg.		
10	4½	5	10	305,000 0 0	381,250 0 0	125	905,090 10 0	45,254 10 3	9,531 5 0	54,785 15 3	(a) 7,414,344 2 2	(a) In addition to this the Company paid as dividends in 1889 a sum of £87,500, being the realization by sale of property to the Champion Reef Company. (b) Dividends are for the year ending 30th September. (c) In addition to this amount, £8,843-15-0 on the agreed valuation of 2s. 6d. per share on 70,750 shares of the Jibutli Gold Mines of Ananthapur, Ltd. was distributed on 18th December 1911. (d) Includes £140,652-19-10 paid by the Nundydroog Gold Mining Co., Ltd.
2,6	10/	11/	2,6	260,000 0 0	(b) 130,000 0 0	50	512,785 13 5	25,639 5 9	3,250 0 0	28,889 5 9	4,013,966 8 6	
10	21/	22/	10	240,772 0 0	78,250 16 0	32½	360,888 10 2	18,044 8 6	3,231 5 5	21,275 13 11	2,214,320 12 6	
10	1½	1½	10	120,000 0 0	51,000 0 0	42½	304,325 17 10	15,216 6 0	2,697 5 10	17,913 12 10	(d) 2,002,768 8 2	
10	26/6	27/6	10	283,000 0 0	(c) 99,050 0 0	35						
...	...	...	...	1,208,772 0 0	739,550 18 0	61-18	2,083,090 11 5	104,154 10 6	18,709 17 3	122,864 7 9	15,650,399 11 4	
...	...	...	...	.....	.....	...	.....	.....	.....	.....	739,550 18 0	
...	...	...	...	.....	9,847 7 4	0-81	8,858 15 11	442 18 11	25 10	468 0 9	.....	
1 20	6/6	7/6	20	212,600 0 0	.....	...	67,103 0 5	3,355 3 0	.....	3,355 3 0	227,800 6 3	
1 20	10/6	11/6	20	95,400 0 0	.....	...	67,103 0 5	3,355 3 0	.....	3,355 3 0	227,800 6 3	
...	...	...	...	308,000 0 0	.....	...	67,103 0 5	3,355 3 0	.....	3,355 3 0	227,800 6 3	
...	...	...	...	.....	.....	...	690 3 11	34 10 5	.....	34 10 5	.....	
...	...	...	...			...						
...	...	...	...			...						
...	...	...	...	1,516,772 0 0	739,550 18 0	48-76	2,150,193 11 10	107,509 13 6	18,709 17 3	126,219 10 9	*15,928,432 15 0	* Includes £30,632-11-11 paid by the Coromandel Gold Mining Co. of India, Ltd., and £19,600-5-6 paid by the Mysore West and the Mysore Wynaal Gold Companies, Ltd.
...	...	...	...	.....	.....	...	.....	.....	.....	.....	739,520 18 0	
...	...	...	...	.....	9,817 7 4	0-65	8,168 7 0	408 8 6	25 1 10	433 10 4	.....	

MACHINERY AND PLANT IN USE AT THE MINES

SPECIF

NAME AND SITUATION OF MINE				STEAM POWER																	Incan	
				BOILERS				STEAM ENGINES														
								Winding and Hauling		Pumping		Crushing		Air Compression		Locomotives		For other purposes		Total Maximum B. H. P. developed		
				Number		Aggregate Area and Capacity (of those in use)																Maximum B. H. P. developed
Total	In use	Grate Area. Sq. feet	Heating Surface. Sq. feet	Maximum Evaporative Capacity. Gallons per hour	Actual Evaporation. Gallons per hour	Number	Maximum B. H. P. developed	Number	Maximum B. H. P. developed	Number	Maximum B. H. P. developed	Number	Maximum B. H. P. developed	Number	Maximum B. H. P. developed	Number	Maximum B. H. P. developed	Total Maximum B. H. P. developed	Number			
1. The Mysore Gold Mine, Bowringpet Taluk, Kolar District	...	80	33	557'00	19,620'00	10,897'00	4,739'00	15	5,970	4	180	(a) 3	400	7	1,680	3	80	6	105	8,416	1,630	
2. The Champion Reef Gold Mine	do do ...	19	14	412'00	12,860'00	4,174'00	3,788'00	4	6,800	2	220	...	...	2	700	...	...	...	...	7,220	1,522	
3. The Ooregum Gold Mine	do do ...	47	12	366'40	7,330'00	5,860'00	3,272'00	5	1,853	2	198	(b) 1	200	1	180	...	...	1	45	2,476	901	
4. The Nundydroog Gold Mine	do do ...	25	11	291'50	6,423'00	3,664'00	1,466'00	3	1,800	2	850	...	...	1	200	...	...	2	32	2,882	960	
5. The Balaghat Gold Mine	do do ...	10	6	191'80	4,506'00	2,246'00	1,006'00	3	920	1	240	...	...	...	...	...	...	...	...	1,160	550	
6. The East Betrayaswami Block	do do ...	1	1	30'00	112'00	*	*	1	20	1	20	...	...	...	...	...	...	...	...	40	...	
7. The Nanjangud Gold Field, Ltd., Nanjangud Taluk, Mysore District	...	2	1	30'70	570'00	...	...	1	12	...	...	...	...	...	...	...	...	...	...	12	...	
8. The Workington Iron and Steel Co. Ltd., Shimoga Taluk, Shimoga District	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	10	445	1	12	457	...	
Total	...	184	78	1,879'40	51,421'00	26,841'00	14,271'00	32	16,875	12	1,708	4	600	11	2,760	13	525	10	194	22,662	5,563	
Total for 1912	...	200	84	2,081'45	59,453'00	31,582'00	18,046'00	32	17,113	13	1,713	11	1,745	9	2,330	13	525	7	232	22,363	5,355	

Boilers classed

TYPE OF BOILER		NUMBER		Grate Area Sq. feet
		Total	In use	
Cornish	...	60	23	528
Lancashire	...	91	47	1,116
Vertical	...	10	3	70
Locomotive	...	4	2	68
Galloway	...	10	3	102
Multitubular	...	...	...	...
Total	...	184	78	1,879
Total for 1912	...	200	84	2,081

STATE OF MYSORE DURING THE YEAR 1913.

1.

Table 2.

ELECTRICITY													REMARKS
MOTORS													
Annual consumption, B. O. T. Units.	Cauvery Power						Kolar Mines Power						
	Number	Used for	Nominal H. P.	Rating in H. P.	Average constant H. P. absorbed	Annual consumption, B. O. T. Units	Number	Used for	Nominal H. P.	Maximum H. P. developed	Annual consumption, B. O. T. Units		
00	227,954	12	{ 7 Air Compressors 4 Mills 1 Ventilating Fans }	3,100	2,963	2,866	18,733,770	27	{ 5 Stone Crushers 4 Hoists 2 Fitting Shop 3 Circular and Cross cut Saws 1 Sample Ore Grinder 4 Pumps 1 Blower 2 Conveyor Belts 2 Sand and Slime Plants 1 Endless Ropeway 2 Tramming Quartz }	1,226	740	1,364,421	(a) Includes Mill Engines and Stone Crusher used only when electric power is not available.
00	185,211	11	{ 5 Air Compressors 3 Mills 1 Ventilating Fans 2 Induced Draught }	2,430	2,180	1,818	11,859,499	22	{ 1 Stone Crusher 7 Pumps 3 Ropeways 4 Hoists 1 Fitting Shop 1 Assay House 1 Machine Tool 2 Circular and Band Saws 2 Slime Plants }	1,647	1,473	1,480,832	
	118,051	16	{ 3 Air Compressors 2 Mills 1 Ropeway 1 Cyanide Plant 2 Pumping slimes 1 Ventilating Fans 5 Pumps 1 Butter's Plant }	1,863	1,614	1,508	*	7	{ 3 Hoists 1 Oil Circulator 1 Picking Floor 1 Fitting Shop 1 Carpenters' Shop }	1,238	*	690,385	(b) Mill Engines used only when electric power is not available. * Information not available
00	77,649	12	{ 5 Air Compressors 2 Mills 5 Pumps }	1,505	1,403	*	*	12	{ 5 Hoists 1 Stone Breaker 1 Band Saw 2 Pumps 1 Sample Crusher 2 Machines }	933	*	677,984	* Information not available
	39,769	12	{ 8 Air Compressors 8 Pumps 1 Mills }	897	737	653	1,272,883	4	{ 2 Machines 1 Saw 1 Stone Breaker }	95	*	85,965	* Information not available
	...	...	.....	...	...	...	.....	...	.....	...	...	.....	* Information not available
	...	...		...	...	...		...		...	...		
	...	...		...	...	...		...		...	...		
00	618,667	63	.....	9,795	8,697	...	.....	72	.....	5,139	...	4,299,587	
00	615,781	62	.....	9,635	8,780	...	.....	67	.....	4,918	..	3,727,555	

ype.

A AND CAPACITY (of those in use)		
	Maximum Evaporative Capacity, Gallons per hour	Actual Evaporation, Gallons per hour
	6,352'00	2,788'00
	18,232'00	10,245'00
	337'00	368'00
	657'00	282'00
	1,263'00	568'00
		
	26,841'00	14,271'00
	31,582'00	18,046'00

MACHINERY AND PLANT IN USE AT THE MINES IN THE STATE

SPECIFICATION No. 2.

NAME AND SITUATION OF MINE	MINING MACHINERY																												
	WINDING ENGINES AND HOISTS												PUMPING ENGINES AND PUMPS																
	Surface						Underground						Miscellaneous						Steam			Electric			Com				
	Steam		Electric		Compressed Air		Steam		Electric		Compressed Air		Steam		Electric		Compressed Air		Number	Maximum capacity in gallons per hour	Average quantity of water pumped. Gallons per hour	Number	Maximum capacity in gallons per hour	Average quantity of water pumped. Gallons per hour	Number				
	Number	Maximum B. H. P. developed	Number	Maximum B. H. P. developed	Number	Maximum B. H. P. developed	Number	Maximum B. H. P. developed	Number	Maximum B. H. P. developed	Number	Maximum B. H. P. developed	Number	Maximum B. H. P. developed	Number	Maximum B. H. P. developed	Number	Maximum B. H. P. developed											
1. The Mysore Southern Extension Syndicate, Ltd., Bowringpet Taluk, Kolar District.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...				
2. The Mysore Gold Mine, Bowringpet Taluk, Kolar District	...	...	15	5,970	1	350	1	10	...	...	...	...	19	290	...	...	3	12	...	...	56	143,880	87,840	2	56,400	50,872	62	10	
3. The Champion Reef Gold Mine	do	do	...	...	4	6,300	2	1,150	...	...	...	...	10	376	...	...	2	30	3	18	16	59,946	24,628	5	63,000	47,500	36	7	
4. The Ooreguni Gold Mine	do	do	...	...	4	1,238	2	680	1	25	...	...	1	350	12	459	2	90	...	...	1	7	24	96,331	48,490	8	81,220	74,724	4
5. The Nundydroog Gold Mine	do	do	...	...	2	1,400	1	350	1	400	...	...	1	350	13	172	1	12	3	55	...	...	2	28,000	1,932	2	45,000	11,841	2
6. The Balaghat Gold Mine	do	do	...	...	4	1,060	...	...	...	...	...	...	...	60	...	...	...	...	3	28	3	21,000	5,350	8	31,850	25,745	3		
7. The East Betrayaswami Block	do	do	...	...	1	20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	5,000	1,500	...	...	...	...	...	
8. The Workington Iron and Steel Co., Ltd., Shimoga Taluk, Shimoga District...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	(d) 4	18,540	...	...	...	...	...	...	
Total	...	...	30	15,988	6	2,530	3	435	...	...	2	700	58	1,357	3	102	8	97	7	53	106	372,697	160,740	25	277,470	210,682	107	19	
Total for 1912	...	...	31	16,528	6	2,530	2	210	...	...	2	700	52	1,188	2	90	8	97	7	53	96	316,263	137,012	25	275,250	201,818	108	21	

OF MYSORE DURING THE YEAR 1913.

Table 3.

REDUCING MACHINERY AND TAILINGS PLANT																									REMARKS
Compressed Air		AIR COMPRESSORS					ROCK DRILLS			ORE FEEDERS		CRUSHING, GRINDING AND AMALGAMATING										CYANIDING			
		Steam		Electric		Average air pressure in receiver	Average Number in use		Approximate quantity of free air consumed per minute	Number	Type	Rockbreakers		Stamps						Number of Vats	Total Capacity of Vats Tons	Total Capacity of Plant for 24 hours. Tons			
		Number	Average quantity of free air delivered per minute. Cubic feet	Number	Average quantity of free air delivered per minute. Cubic feet		Stopping	Development				Number	Type	Number	Weight in lbs. of each head	Number of drops per minute	Height of drop in inches	Depth of discharge in inches	Kind of Screen				Number of holes per sq. inch		
per hour	Average quantity of water pumped. Gallons per hour	Number	Average quantity of free air delivered per minute. Cubic feet	Number	Average quantity of free air delivered per minute. Cubic feet	lbs. per sq. in.	Stopping	Development	Cubic feet	Number	Type	Number	Type	Number	Weight in lbs. of each head	Number of drops per minute	Height of drop in inches	Depth of discharge in inches	Kind of Screen	Number of holes per sq. inch	Number of Vats	Total Capacity of Vats Tons	Total Capacity of Plant for 24 hours. Tons		
000	28,100	6	7,949	6	12,127	60	14:50	97:30	16,770	12	Challenge with Hoscur Patent	10	2 Blake Marsden 4 Hadfield and Jack. 1 Bigelow.	210	1,150	96	7:50	3:00	Woven wire	1,200	16	2,980	745		
569	11,445	1	2,857	4	12,253	51	22:00	56:00	4,923	31	Challenge	4	Blake Marsden	140	1,250	96	8:00	4:00	Do	1,200	(a)38	4,200	900	(a) 20 steel and 18 wood.	
760	280	1	1,550	3	7,180	56	1:00	42:50	4,675	20	Do	1	2 Do 2 Gates	80	1,280	96	8:50	2:50	Do	1,000	8	1,716	429		
930	3,692	1	910	5	6,640	52	1:43	30:85	4,681	18	Hoscur	3	1 Hadfield 2 Blake Marsden	90	900	96	7:25	2:00	Woven wire and Punch-rod copper	966 & Nos. 6 & 7 Needle 1,000	(b)12	928	302	(b) 5 wood and 7 steel.	
400	4,100	...	...	3	2,954	55	0:38	7:33	1,542	6	Hoscur	3	Blake Marsden	30	1,050	96	8:00	2:50	Woven wire		(c) 19	945	304	(c) 16 wood and 3 iron.	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...		
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...		
659	47,587	9	12,696	21	41,451	53	39:31	236:58	32,981	120	..	21	...	550	5,630	96	7:65	2:80	..	...	93	10,769	2,680	(d) Used for pump- ing water for locomotives. 2 worked by manual la- bour and the other 2 by steam.	
272	84,223	8	11,571	21	41,281	56	45:00	255:60	37,061	116	...	23	...	550	1,139	96	8:00	2:90	...	...	93	10,893	2,680		

STATEMENT OF WORK DONE AND NUMBER OF PERSONS EMPLOYED AT MINES WORKING IN THE STATE OF MYS

NAME AND SITUATION OF MINE	MINING				TONS OF MATERIAL TREATED							PERSONS EMPLOYED					
	Feet driven	Shafts sunk (feet)	Stoping (cubic fathoms)	Total material excavated (tons)	ORE				TAILINGS	Aggregate amount treated in mills and by tailings process	BELOW GROUND					Europeans	
					Raised to surface	Percentage sorted out as waste	Ore obtained	Milling and Amalgamating Crushed by stamps Crushed per stamp per 24 hours			Treated by cyanide	Europeans	Anglo-Indians	Indians	Total		Tons excavated per man per annum
GOLD																	
1. The Mysore Southern Extension Syndicate, Ltd., Bowringpet Taluk, Kolar District	772-50	...	...	2,377-50	731-00	16-49	613-00	...	...	...	...	...	...	28	28	82-77	...
2. The Mysore Gold Mine do do	27,331-50	1,430-00	17,467-50	431,980-20	390,457-00	22-64	302,049-00	302,662-00	4-13	(a) 264,829-00	567,491-00	107	35	5,195	5,337	80-94	64
3. The Champion Reef Gold Mine do do	18,195-00	1,528-00	11,430-00	335,946-20	273,520-00	18-89	221,839-00	219,659-00	4-46	(b) 345,552-00	565,211-00	78	9	3,683	3,770	89-11	73
4. The Ooregunn Gold Mine do do	14,813-00	587-00	6,084-60	190,054-22	167,356-00	12-09	153,636-00	153,636-00	5-61	(c) 166,206-00	319,842-00	43	10	2,562	2,615	72-68	57
5. The Nundydroog Gold Mine do do	12,521-50	665-00	8,896-36	137,636-13	99,757-00	7-84	91,939-00	90,650-00	3-25	94,665-00	185,315-00	33	32	2,199	2,264	60-82	41
6. The Balaghat Gold Mine do do	5,498-75	...	2,010-80	61,239-33	48,712-00	16-37	40,739-00	42,700-00	4-01	96,252-00	138,952-00	5	7	824	836	73-28	16
7. The East Betrayaswami Block do do	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2
8. Ahmed's Block do do	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
9. The Eastern Development Corporation, Ltd., Koppa and Tarikere Taluks, Kadur District; and Shimoga and Honnali Taluks, Shimoga District	...	...	...	...	...	...	...	...	...	...	...	...	...	15	15	...	1
10. The Kadur Shimoga Gold Fields Syndicate, Ltd., Tarikere Taluk, Kadur District	343-00	54-50	...	760-00	...	...	...	...	...	...	...	1	1	55	57	13-33	1
11. The Nanjangud Gold Field, Ltd., Nanjangud Taluk, Mysore District	98-00	...	...	210-13	...	...	...	...	...	...	...	1	...	30	31	7-75	...
12. The Lakkavalli Gold Syndicate, Ltd., Koppa Taluk, Kadur District	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
13. The North Kolar Gold Syndicate, Ltd., Kolar, Mulbagal and Srinivasapur Taluks, Kolar District	...	...	...	...	...	...	...	...	...	...	...	...	...	2	2	...	...
14. The Gold Fields of Mysore and General Exploration Co., Ltd., Blocks in Honnali Taluk, Shimoga District	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
15. Mr. Courpalai's Prospecting and Mining Blocks, Tarikere Taluk, Kadur District	...	...	...	...	...	...	...	...	...	...	...	...	1	14	15	...	1
OTHER MINERALS.																	
16. The Workington Iron and Steel Co., Ltd., Shimoga Taluk, Shimoga District.	...	...	...	136,416-00	...	...	20,227-20	...	...	...	...	...	...	...	...	...	6
17. Mr. M. D. Mohamed Ali's Block, Chiknayakanhalli Taluk, Tumkur District.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
18. The Tata Iron and Steel Co., Ltd., Mysore and Nanjangud Taluks, Mysore District	...	...	...	...	...	...	2,365-44	...	...	...	...	...	...	...	...	...	...
19. Mr. V. Manikavelu Modaliar's Blocks do do	...	...	...	...	...	...	925-12	...	...	...	...	...	...	...	...	...	...
20. Mr. J. Burr's Blocks, Mysore Taluk, Mysore District; and Arsikere Taluk, Hassan District	...	...	...	...	...	...	546-56	...	...	...	...	...	...	...	...	...	1
21. Mr. T. Chinnasamiar's Blocks, Yedatore Taluk, Mysore District; and Hole-Narsipur Taluk, Hassan District	...	...	...	...	...	...	0-50	...	...	...	...	...	...	32	32	...	...
22. Mr. H. J. E. Mac Carthy's Block, Nanjangud Taluk, Mysore District	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	79,576-23	4,264-50	40,389-26	1,296,680-31	980,536-00	17-97	834,879-82	809,307-00	4-29	967,604-00	1,776,811-00	268	95	14,639	15,002	77-67	264
Total for 1912	81,752-05	4,593-25	41,329-29	1,222,637-02	975,939-90	15-77	845,631-73	808,507-00	4-32	900,517-00	1,709,024-00	271	101	16,045	16,417	74-47	240

ORE DURING THE YEAR 1913.

Table 4.

PERSONS EMPLOYED							REMARKS
ON SURFACE						Total number of persons employed below ground and on surface	
Anglo-Indians	Indians			Total	Tons handled per man per annum		
	Males	Females	Children under 12 years				
...	...	...	...	...	...	28	
73	2,613	440	61	3,254	174.40	8,591	(a) Includes 13,740 tons of slimes
84	2,331	962	76	2,926	193.17	6,696	(b) Includes 45,533 tons of slimes
37	1,646	149	...	1,889	169.32	4,504	(c) Includes 26,330 tons of slimes
32	1,127	444	...	1,644	112.72	3,908	
7	535	104	40	702	197.94	1,538	
2	22	5	...	31	...	31	
...	35	12	...	47	...	47	
2	34	...	...	37	...	52	
1	32	..	...	34	...	91	
...	12	4	2	18	..	49	
1	4	...	...	5	...	5	
1	2	...	...	3	...	5	
1	8	...	...	10	...	10	
...	...	...	...	1	...	16	
30	415	91	6	543	...	548	Manganese.
...	20	10	10	40	...	40	Do.
...	199	124	...	323	...	323	Magnesite.
...	29	80	7	116	...	116	Chromium.
...	150	50	...	201	...	201	Do.
...	88	62	36	186	...	218	Mica.
...	10	...	...	10	...	10	Copper.
271	9,312	1,937	241	12,025	170.60	27,027	
283	8,302	1,636	204	10,671	160.16	27,088	

STATEMENT OF QUANTITY

NAME AND SITUATION OF MINE			FUEL						ELECTRIC POWER				TIMBER		
	Indian Coal		English Coal		Firewood		Total Cost	Cost per Ton milled	Cauvery Scheme		Kolar Mines		Quantity	Cost	Cost per Ton milled
	Tons used	Cost	Tons used	Cost	Tons used	Cost			Total Cost	Cost per Ton milled	Total Cost	Cost per Ton milled			
		£ Stg.		£ Stg.		£ Stg.	£ Stg.	Shillings	£ Stg.	Shillings	£ Stg.	Shillings	C. ft.	£ Stg.	Shillings
1. The Mysore Southern Extension Syndicate, Ltd., Bowringpet Taluk, Kolar District	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2. The Mysore Gold Mine, Bowringpet Taluk, Kolar District	...	47,920.32	50,643.71	...	1,044.96	498.03	51,111.74	3.38	29,378.89	1.91	7,106.38	0.47	242,230	23,951.67	1.58
3. The Champion Reef Gold Mine	do	26,861.74	28,176.48	...	371.95	177.20	28,353.68	2.58	21,737.52	1.98	7,495.12	0.68	205,156	18,819.93	1.72
4. The Ooregum Gold Mine	do	12,003.01	12,603.70	...	859.04	348.20	12,956.90	1.68	13,350.98	1.71	(b) 5,031.22	0.66	118,550	7,995.75	1.04
5. The Nundydroog Gold Mine	do	9,004.24	9,510.00	...	157.08	124.00	9,633.00	2.13	13,948.00	3.08	(c) 1,502.00	0.99	113,171	10,925.00	2.11
6. The Balaghat Gold Mine	do	3,237.92	3,256.25	...	182.78	145.50	3,401.75	1.59	7,337.90	3.41	177.80	0.22	28,618	2,186.00	1.02
7. The East Betrayaswami Block	do	11.20	11.00	...	731.00	300.00	311.00	...	...	...	...	...	220	11.00	...
8. The Nanjangud Gold Field, Ltd., Nanjangud Taluk, Mysore District	...	...	...	...	201.60	50.73	50.73	...	...	...	...	...	303	20.20	...
9. The Kadur Shimoga Gold Fields Syndicate, Ltd., Tarikere Taluk, Kadur District	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
10. The Workington Iron and Steel Co., Ltd., Shimoga Taluk, Shimoga District	...	...	...	1,291.00	291.56	95.35	1,386.35	...	...	...	...	...	...	...	...
11. The Tata Iron and Steel Co. Ltd., Mysore and Nanjangud Taluks, Mysore District	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	99,038.46	104,206.14	843.36	1,291.00	3,995.97	1,738.01	107,235.15	2.60	85,753.29	2.12	21,615.82	0.61	708,278	63,972.55	1.58
Total for 1912	81,632.12	93,321.72	2,968.30	4,600.27	6,537.83	3,733.80	101,659.39	2.51	81,665.31	2.09	21,950.10	0.51	689,757	61,081.61	1.59

ND COST OF MATERIALS CONSUMED AND WAGES PAID AT THE MINES WORKING IN THE STATE OF MYSORE FOR THE YEAR 1913.

EXPLOSIVES											CANDLES			MERCURY			CYANIDE				ZINC			For drills and jumpers		Bar rolled
Blasting Gelatine		Dynamite and other Explosives		Detonators		Fuse																				
Quantity	Cost	Quantity	Cost	Number of boxes (100 per box)	Cost	Number of coils (24 feet per coil)	Cost	Total Cost	Cost per Ton excavated	Cost per Ton milled	Quantity	Cost	Cost per Ton milled	Quantity	Cost	Cost per Ton milled	Quantity	Cost	Cost per Ton treated	Cost per Ton milled	Quantity	Cost	Cost per Ton milled	Quantity	Cost	Quantity
lbs.	£ Stg.	lbs.	£ Stg.		£ Stg.		£ Stg.	£ Stg.	Shillings	Shillings	lbs.	£ Stg.	Shillings	lbs.	£ Stg.	Shillings	lbs.	£ Stg.	Shillings	Shillings	lbs.	£ Stg.	Shillings	Tons	£ Stg.	Tons
4,250	271.48	..	..	91	17.42	1,005	29.32	321.22	2.77	..	1,326	22.10	..	..	..	..	..	..	..	..	..	..	..	1.79	37.53	..
231,890	15,169.97	4,950	212.35	7,591	1,407.50	79,000	2,304.16	19,123.98	0.88	1.25	256,270	4,271.16	0.28	3,015	826.96	0.022	124,096	4,797.33	0.36	0.32	25,354	373.33	0.025	91.81	1,913.33	22
179,650	11,628.98	12,079	586.76	4,893	905.38	51,838	1,511.91	14,633.06	0.87	1.33	204,332	3,405.53	0.31	3,839	390.00	0.036	216,219	8,862.65	0.51	0.81	30,600	473.87	0.013	156.21	1,330.78	10
126,665	8,201.07	..	..	3,712	698.57	42,606	1,238.15	10,137.79	1.06	1.32	116,649	1,952.17	0.25	650	74.30	0.010	88,256	3,593.07	0.43	0.17	16,352	263.99	0.031	21.97	512.51	9
85,001	5,516.00	..	..	2,951	549.00	36,106	1,049.00	7,114.00	1.03	1.57	110,891	1,818.00	0.41	898	101.00	0.022	52,724	2,133.00	0.45	0.47	7,141	114.00	0.025	27.65	638.00	7
40,510	2,624.00	..	..	1,317	256.25	15,085	438.50	3,318.75	1.08	1.55	43,967	733.00	0.34	510	60.00	0.028	51,968	2,168.00	0.45	1.02	6,442	103.00	0.018	15.12	307.00	10
..	..	..	..	..	..	..	..	..	..	..	100	3.00	..	..	..	..	..	..	..	..	..	..	..	..	..	..
335	44.66	..	..	25	6.66	50	1.60	52.92	4.41	..	220	5.00	..	..	..	..	..	..	..	..	..	..	..	..	..	..
938	84.50	..	..	5	1.38	380	29.00	114.88	3.02	..	570	9.13	..	..	..	..	..	..	..	..	..	..	..	0.28	7.50	..
..	..	20	0.70	..	..	..	..	0.70	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	10.08	122.35	..
..	..	685	19.00	1	0.33	276	22.30	41.63	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
672,239	13,543.66	17,731	818.81	20,589	3,812.49	226,546	6,623.97	54,858.93	0.84	1.35	734,325	12,249.09	0.30	8,912	952.26	0.023	533,263	21,554.05	0.45	0.53	85,889	1,324.19	0.033	327.97	5,508.00	50
671,267	13,490.72	18,830	915.52	20,881	3,867.18	230,240	6,721.13	51,994.55	0.90	1.36	756,963	12,621.60	0.31	9,106	1,112.03	0.028	519,789	21,066.75	0.47	0.52	75,226	1,167.79	0.029	195.88	4,523.88	18

Average Wages per Month.

CLASS	EUROPEANS		INDIANS	
	£ Stg.	Rs.	£ Stg.	Rs.
Underground Agents	..	..	..	..
Engineers	31.50	41.73	..	..
Reduction Officers	35.87	15.41	..	..
Millmen	..	..	..	..
Carpenters	24.30	24.25	1.82	2.17
Smiths	..	..	..	..
Engine Drivers	19.50	21.75	1.91	1.59
Miners	..	..	..	..
Blasters	..	..	1.97	..
Timbermen	16.36	..	2.01	..
Cyanide Chemists	59.37	..	..	..
Assistant Cyanide Chemists	34.39	19.20	..	..
Pitmen	..	..	..	..
Boiler Smiths	24.83	..	1.75	..
Underground Coolies..	..	..	0.99	..
Surface Coolies	..	..	0.55	..
Trammers	..	..	0.98	..
Firemen	..	..	0.92	..
Mestris	..	..	2.06	..
Landers	..	..	0.95	..
Average for above classes	23.85	..	1.51	..
Average for above classes in 1912	25.74	..	1.57	..

Table 5.

STEEL						PIG IRON, WROUGHT IRON AND IRON CASTINGS			SHOES AND DIES			WAGES		Total of these costs per Ton milled	REMARKS
Plates and sections, etc.		Castings made locally and imported		Total Cost	Cost per Ton milled	Quantity	Cost	Cost per Ton milled	Quantity	Cost	Cost per Ton milled	Total Amount	Per Ton milled		
	Cost	Quantity	Cost												
	£ Stg.	Tons	£ Stg.	£ Stg.	Shillings	Tons	£ Stg.	Shillings	Tons	£ Stg.	Shillings	£ Stg.	Shillings	Shillings	
	...	...	...	37-53	...	...	...	...	...	...	...	479-10	...	...	
00	2,666-66	306-10	3,380-00	7,959-99	0-53	322-22	1,763-83	0-116	160-78	3,401-22	0-22	191,078-75	12-82	22-96	
10	1,133-88	231-95	2,268-65	5,342-31	0-49	110-11	1,887-97	0-126	13-34	652-55	0-06	164,247-58	14-95	25-12	(a) Includes 99-56 tons of rails.
71	902-37	...	...	1,411-88	0-19	53-00	476-87	0-062	38-82	508-15	0-07	82,973-58	10-80	18-33	(b) Includes cost of lighting.
73	650-00	...	...	1,288-00	0-28	80-61	723-00	0-160	22-30	353-00	0-08	67,881-00	14-98	26-61	(c) Includes £ 971 cost of lighting.
61	110-00	10-00	188-00	605-00	0-28	40-01	386-00	0-181	11-07	172-50	0-08	31,919-68	14-95	21-75	
	...	...	...	...	...	0-28	3-00	...	...	...	...	1,400-00	...	...	
	...	...	...	...	...	...	...	...	...	...	...	359-28	...	...	
	...	...	...	7-50	...	...	...	...	...	...	...	1,230-00	...	...	
	...	...	...	122-35	...	16-52	62-50	...	...	...	...	13,726-45	...	...	
	...	...	...	...	...	...	...	...	...	...	...	405-75	...	...	
51	5,462-91	548-05	5,836-65	16,807-56	0-41	652-81	4,802-67	0-117	276-31	5,087-12	0-13	558,701-17	13-38	23-18	
20	4,839-55	685-15	8,312-95	17,676-38	0-41	365-10	3,709-70	0-092	219-13	5,250-74	0-13	641,730-87	13-40	23-04	

TABLE OF GOLD PRODUCTION AND WORKING COSTS AT THE GOLD MINES WORKING IN THE

NAME AND SITUATION OF MINE					GOLD PRODUCTION														
					FROM MILLS					BY CYANIDE PROCESS					From other Sources		TOTAL PRODUCTION		
					Assay value of Ore treated. Shillings per Ton	Fine Gold	Value		Percentage recovered	Assay value of Tailings. Shillings per Ton	Fine Gold	Value		Percentage Recovered	Fine Gold. Ounces	£ Stg.	Fine Gold	Value	
						Ounces	£ Stg.	Shillings per Ton			Ounces	£ Stg.	Shillings per Ton				Ounces	£ Stg.	Shillings per Ton
1. The Mysore Gold Mine, Bowringpet Taluk, Kolar District	...	...	65'00	187,789'913	798,107'13	52'74	81'14	11'39	25,731'361	109,358'28	8'26	72'51	...	...	213,521'274	907,465'41	58'31		
2. The Champion Reef Gold Mine	do	do	17'28	95,400'517	405,452'20	36'92	78'08	10'40	25,556'403	108,614'71	6'29	60'41	...	...	120,956'920	511,066'91	50'30		
3. The Ooregum Gold Mine	do	do	19'05	66,004'952	280,521'05	36'52	74'45	13'32	19,120'702	81,262'98	9'78	73'41	...	...	85,125'654	361,784'03	47'30		
4. The Nundydroog Gold Mine	do	do	73'67	65,602'305	278,803'79	61'51	83'50	10'62	6,211'019	26,396'96	5'58	52'51	...	...	71,813'354	305,206'75	67'30		
5. The Balaghat Gold Mine	do	do	31'37	12,772'948	54,285'03	25'43	91'05	6'16	3,059'937	13,004'73	2'70	43'87	...	...	15,832'885	67,289'76	31'30		
Total	...	...	56'35	427,570'635	1,817,175'20	44'91	79'69	10'77	79,679'452	338,637'66	7'00	65'00	...	...	507,250'067	2,155,812'86	53'30		
Total for 1912	...	...	56'22	431,697'446	1,831,714'15	45'39	80'73	9'87	77,534'791	329,522'88	7'32	74'15	...	...	509,232'210	2,161,237'03	53'30		

STATE OF MYSORE DURING THE YEAR 1913.

Table 6.

WORKING COSTS (INCLUDING TRANSPORT AND MAINTENANCE)								Total Expenditure (including administration)	REMARKS
MINING			MILLING		CYANIDING				
£ Stg	Shillings per Ton exca- vated	Shillings per Ton milled	£ Stg.	Shillings per Ton milled	£ Stg.	Shillings per Ton treated	Shillings per Ton milled		
250,872.47	11.62	16.58	32,881.75	2.17	19,132.00	1.44	24.24		
198,370.08	11.81	18.06	25,621.23	2.33	29,116.42	1.69	26.65		
123,750.51	13.02	16.11	16,757.95	2.18	14,512.55	1.75	22.69		
113,468.00	16.48	25.03	11,231.00	2.48	7,523.00	1.59	31.79		
42,697.95	13.94	20.00	4,691.43	2.20	6,101.98	1.27	29.33		
729,159.01	12.58	18.02	91,189.36	2.25	76,385.95	1.58	25.72		
709,108.09	11.63	17.54	92,156.42	2.28	72,499.15	1.61	25.11		

NUMBER AND CLASSIFICATION OF FATAL AND SERIOUS ACCIDENTS AT MINES WORKING IN THE STATE OF MYSORE DURING THE YEAR 1913.

Table 7.

NAME AND SITUATION OF MINE				FALLS IN MINES				IN AND AT SHAFTS							MISCELLANEOUS BELOW GROUND									ON SURFACE					TOTAL DUE TO						
				Falls of Hanging Wall	Falls of Sides or Roof	Falls of Ore from working places	Total Falls	Over-winding	Ropes and Chains breaking	Whilst ascending or descending by Machinery	Falling into Shaft from Surface	Falling from part way down	Things falling from Surface	Things falling from part way down	Miscellaneous	Total in and at Shafts	Suffocation by Gases	Explosion due to Misfire	By Explosives (other than Misfires)	Falls of Persons or Things in Rises, Winzes and Stopes	On Inclined and Engine Planes			By Trams or Tubs, but not on Inclined and Engine Planes	By Machinery	By other causes	Total Miscellaneous Below Ground	By Machinery	Boilers and Steam Pipes bursting, etc.	On Railways, Tramways or Aerial Ropeways belonging to Mine	Miscellaneous	Total on Surface	Negligence	Recklessness	Unavoidable	Grand Total
Number of Class of Accident				i	ii	iii		iv	v	vi	vii	viii	ix	x	xi		xii	xiii	xiv	xv	xvi	xvii	xviii	xix		xx	xxi	xxii	xxiii						
1. The Mysore Gold Mine, Bowringpet Taluk, Kolar District				2	1	...	3	...	...	4	...	1	...	2	12	19	...	9	...	5	...	1	1	18	31	...	...	4	7	11	12	6	49	67	
2. The Champion Reef Gold Mine do do				4	...	...	4	...	...	1	...	5	...	3	12	21	...	6	...	4	...	6	...	27	43	3	...	12	5	20	9	6	73	88	
3. The Ooregunn Gold Mine do do				1	...	1	2	...	...	1	...	3	...	2	8	14	...	5	...	5	...	1	...	29	40	2	...	3	3	8	10	9	45	64	
4. The Nundydroog Gold Mine do do				2	...	...	2	...	...	3	...	3	...	3	8	17	...	2	1	2	...	2	...	11	18	2	...	2	3	7	7	10	27	44	
5. The Balaghat Gold Mine do do				...	...	1	1	...	...	...	...	1	...	1	2	...	...	...	1	...	...	1	...	5	7	...	...	3	...	3	0	0	13	13	
6. The East Betrayaswami Block do do				...	...	...	0	...	...	...	...	1	...	...	1	...	...	...	...	...	...	...	...	0	...	...	...	...	0	0	0	1	1		
7. The Workington Iron and Steel Co., Ltd., Shimoga Taluk, Shimoga District				...	...	...	0	...	...	...	...	...	...	...	0	...	...	...	...	...	...	...	...	0	...	...	1	...	1	0	0	1	1		
Total				9	1	2	12	0	0	9	0	11	0	10	41	74	0	22	1	17	0	10	2	90	142	7	0	25	18	50	38	31	209	278	
Number due to				Negligence	5	0	0	5	0	0	3	0	3	0	2	11	0	17	0	2	0	0	0	0	19	1	0	2	0	3					
				Recklessness	0	0	0	0	0	0	5	0	1	0	0	2	8	0	3	1	4	0	3	0	1	12	4	0	4	3	11				
				Unavoidable	4	1	2	7	0	0	1	0	10	0	7	37	55	0	2	0	11	0	7	2	89	111	2	0	19	15	36				

NUMBER OF FATAL AND SERIOUS ACCIDENTS PER 1,000 PERSONS EMPLOYED AT MINES WORKING IN THE STATE OF MYSORE DURING THE YEAR 1913.

Table 8.

NAME AND SITUATION OF MINE	NUMBER PER 1,000 DUE TO			Total per 1,000	Total per 1,000 for the year 1912	Total per 1,000 for the year 1911	REMARKS
	Negligence	Recklessness	Unavoidable				
1. The Mysore Gold Mine, Bowringpet Taluk, Kolar District ...	1.40	0.70	5.70	7.80	8.84	10.65	In these columns, in order to avoid large and misleading figures in the case of mines employing less than 1,000 persons, the actual figures obtained for these mines have been modified in the following way:— If the actual figure is less than the average (for all Mines), it is inserted here. If the actual figure is greater than the average, the excess above the average is reduced in proportion of the number of persons employed to 1,000. The figure inserted here is equal to the average plus this reduced excess.
2. The Champion Reef Gold Mine do do ...	1.34	0.90	10.90	13.14	13.86	21.25	
3. The Ooregum Gold Mine do do ...	2.22	2.00	9.99	14.21	10.24	13.51	
4. The Nundydroog Gold Mine do do ...	1.79	2.56	6.91	11.26	11.23	13.51	
5. The Balaghat Gold Mine do do ...	0.00	0.00	8.45	8.45	8.91	12.49	
6. The East Betrayaswami Block do do ...	0.00	0.00	8.49	8.49	0.00	0.00	
7. The Kadur Shimoga Gold Fields Syndicate, Ltd., Tarikere Taluk, Kadur District. ...	0.00	0.00	0.00	0.00	10.00	0.00	
8. The Workington Iron and Steel Co. Ltd., Shimoga Taluk, Shimoga District ...	0.00	0.00	1.82	1.82	2.96	0.00	
Average for all Mines ...	1.41	1.15	7.73	10.29	10.52	13.97	
Average for 1912 ...	1.11	0.96	8.45				

NUMBER OF PERSONS KILLED IN ACCIDENTS AT MINES WORKING IN THE STATE OF MYSORE DURING THE YEAR 1913.

Table 9

NAME AND SITUATION OF MINE	FALLS IN MINES							IN AND AT SHAFTS						MISCELLANEOUS BELOW GROUND								ON SURFACE					Grand Total	
	Falls of Hanging Wall	Falls of Sides or Roof	Falls of Ore from working places	Total Falls	Over-winding	Ropes and Chains breaking	Whilst ascending or descending by Machinery	Falling into Shaft from Surface	Falling from part way down	Things falling from Surface	Things falling from part way down	Miscellaneous	Total in and at Shafts	Suffocation by Gases	Explosion due to Misfire	By explosives (other than Misfires)	Falls of Persons or Things in Rises, Winzes and Stopes	On Inclined and Engine Planes	By Trams or Tubs, but not on Inclined and Engine Planes	By Machinery	By other causes	Total Miscellaneous Below Ground	By Machinery	Boiler and Steam Pipes bursting, etc.	On Railways, Tramways or Aerial Ropeways belonging to Mine	Miscellaneous		Total on Surface
Number of Class of Accident ...	i	ii	iii		iv	v	vi	vii	viii	ix	x	xi		xii	xiii	xiv	xv	xvi	xvii	xviii	xix		xx	xxi	xxii	xxiii		
1. The Mysore Gold Mine, Bowringpet Taluk, Kolar District ...	1	...	...	1	...	...	42	...	...	...	..	1	43	...	2	...	1	...	...	...	1	4	...	...	...	..	0	48
2. The Champion Reef Gold Mine do do ...	2	...	...	2	...	...	...	...	1	...	1	10	16	...	3	...	...	...	...	...	16	19	1	...	...	1	2	39
3. The Ooregum Gold Mine do do ...	...	...	...	0	...	...	...	...	2	...	...	2	4	...	2	...	4	...	...	...	4	10	...	...	...	..	0	14
4. The Nundydroog Gold Mine do do ...	1	...	...	1	...	...	...	...	2	...	1	1	5	...	...	1	...	...	...	...	1	2	1	...	...	...	1	9
5. The Balaghat Gold Mine do do ...	...	...	...	0	...	...	...	...	1	...	...	...	1	...	...	...	...	...	...	...	1	1	...	...	...	...	0	2
6. The East Betrayaswami Block do do ...	...	...	...	0	...	...	...	...	...	...	...	...	0	...	...	...	...	...	...	...	...	0	...	...	...	...	0	0
7. The Workington Iron and Steel Co. Ltd., Shinoga Taluk, Shinoga District ...	...	...	...	...	...	...	...	...	...	...	...	...	0	...	...	...	...	...	...	...	...	0	...	...	...	...	0	0
Total ...	4	0	0	4	0	0	44	0	9	0	2	14	69	0	7	1	5	0	0	0	23	36	2	0	0	1	3	112

NUMBER OF PERSONS SERIOUSLY INJURED IN ACCIDENTS AT MINES WORKING IN THE STATE OF MYSORE DURING THE YEAR 1913. Table 10.

NAME AND SITUATION OF MINE							FALLS IN MINES				IN AND AT SHAFTS								MISCELLANEOUS BELOW GROUND								ON SURFACE					Grand Total		
							Falls of Hanging Wall	Falls of Sides or Roof	Falls of Ore from working places	Total Falls	Overwinding	Ropes and Chains breaking	Whilst ascending or descending by Machinery	Falling into Shaft from Surface	Falling from part way down	Things falling from Surface	Things falling from part way down	Miscellaneous	Total in and at Shafts	Suffocation by Gases	Explosion due to Misfire	By Explosives (other than Misfires)	Falls of Persons or things in Rises, Winzes and Slopes	On Inclined and Engine Planes	By Trams or Tubs, but not on Inclined and Engine Planes	By Machinery	By other causes	Total Miscellaneous Below Ground	By Machinery	Boilers and Steam Pipes bursting, etc.	On Railways, Tramways or Aerial Ropeways belonging to Mine		Miscellaneous	Total on Surface
Number of Class of Accident							i	ii	iii		iv	v	vi	vii	viii	ix	x	xi		xii	xiii	xiv	xv	xvi	xvii	xviii	xix		xx	xxi	xxii	xxiii		
1. The Mysore Gold Mine, Bowringpet Taluk, Kolar District							1	1	...	2	...	...	3	...	1	...	2	11	17	...	10	...	4	...	1	1	18	31	...	...	4	7	11	61
2. The Champion Reef Gold Mine do do							3	...	...	3	...	...	...	...	1	...	3	17	21	...	5	...	4	...	6	...	27	42	2	...	12	4	18	81
3. The Ooregum Gold Mine do do							1	...	1	2	...	...	1	...	1	...	2	9	13	...	4	...	1	...	1	...	28	34	2	...	3	3	8	57
4. The Nundydroog Gold Mine do do							1	...	...	1	...	...	2	...	2	...	2	9	15	...	2	...	2	...	2	...	11	17	1	...	2	3	6	39
5. The Balaghat Gold Mine do do							...	...	1	1	...	...	...	...	...	...	1	1	...	...	...	1	...	...	...	1	4	6	...	...	3	...	3	11
6. The East Betrayaswami Block do do							...	...	...	0	...	...	...	...	1	...	...	...	1	...	...	...	...	...	...	...	0	...	...	...	...	0	1	
7. The Workington Iron and Steel Co., Ltd., Shimoga Taluk, Shimoga District							...	...	...	0	...	...	...	...	...	...	...	0	...	...	...	...	...	...	...	...	0	...	...	1	...	1	1	
Total							6	1	2	9	0	0	6	0	6	0	9	47	68	0	21	0	12	0	10	2	88	133	5	0	25	17	47	257

COMPARATIVE TABLE SHOWING THE MORTALITY AND OTHER ITEMS AT GOLD MINES WORKING IN THE STATE OF M

I T E M S .			M Y S O R E																			
Year ...	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1895	1896	1
1. Number of separate accidents (fatal and serious) per 1,000 persons employed	7.29	5.68	4.53	5.79	8.88	9.55	8.42	8.37	7.75	8.31	8.31	13.07	12.39	14.39	14.34	15.14	14.21	10.71	10.83	...	...	
2. Death rate per 1,000 persons employed above ground ...	0.69	0.53	0.53	0.51	0.66	0.70	1.29	0.57	1.13	0.25	0.59	0.66	0.39	0.28	0.36	0.95	0.59	0.49	0.28	...	...	
3. Death rate per 1,000 persons employed below ground ...	7.01	8.15	7.55	4.09	2.66	4.17	4.29	3.30	3.29	2.39	3.47	3.17	2.69	4.70	5.73	3.34	5.09	5.12	7.28	...	...	
4. Death rate per 1,000 persons employed (above and below ground) ...	4.05	1.97	4.88	2.45	1.80	2.61	2.29	2.21	2.52	1.53	2.51	2.30	1.92	3.03	3.64	2.72	3.35	3.36	4.38	4.64	4.95	
5. Number of persons employed for each 100,000 tons of quartz crushed	5,124	5,648	5,486	5,713	5,546	5,467	4,970	4,684	3,988	4,036	3,882	4,091	4,190	4,059	3,905	3,471	3,303	3,278	3,160	1,579	1,705	1
6. Number of persons killed for each 100,000 tons of quartz crushed	20.76	10.79	26.78	14.02	9.99	14.00	14.87	10.34	10.06	6.16	9.73	9.41	8.04	12.49	14.20	9.45	11.07	11.01	13.84	7.33	8.44	
7. Number of persons employed for each £100,000 worth of gold obtained	1,268	1,362	1,336	1,371	1,257	1,308	1,303	1,347	1,195	1,299	1,288	1,403	1,499	1,422	1,374	1,288	1,229	1,225	1,186	720	853	
8. Number of persons killed for each £100,000 worth of gold obtained	5.14	2.60	6.52	6.36	2.26	3.35	3.90	2.95	3.01	1.94	3.23	3.23	2.88	4.37	5.00	3.50	4.12	4.11	5.20	3.31	4.23	
9. Average value (in shillings) of quartz (gold obtained per ton crushed)	80.83	82.93	82.12	83.35	88.25	93.54	76.27	70.24	66.73	63.56	60.55	58.33	55.97	57.12	56.83	53.96	53.72	53.54	53.28	43.85	39.96	3

YSORE AND IN THE TRANSVAAL.

Table 11.

TRANSVAAL											REMARKS
1897	1898	1902	1905-06	1906-07	1907-08	1908-09	1909-10	1911	1912	1913	
...	...	10.22	10.14	8.73	8.66	9.57	9.95	10.11	10.75	11.50	
...	...	...	1.45	1.40	1.34	1.48	1.32	1.46	1.49	1.44	
...	...	...	7.97	6.48	5.60	7.23	5.98	5.58	4.96	4.82	
31	4.65	3.83	5.83	4.98	4.40	5.53	4.46	4.33	4.02	3.96	
43	1,160	1,085	1,180	1,040	983	882	876	844	803	765	
79	5.40	4.15	6.40	5.18	4.32	4.88	3.91	3.65	3.23	3.03	
75	572	512	680	604	602	589	616	601	555	549	
91	2.65	1.94	3.97	3.01	2.65	3.26	2.75	2.60	2.23	2.17	
97	40.63	42.96	34.68	34.43	32.67	29.94	28.42	27.98	28.95	27.90	

LIST OF MINING PROPERTIES LEASED, ASSIGNED OR ABANDONED IN THE STATE OF MYSORE FROM JULY 1913 TO JUNE 1914.

A.—Leased.

Table 12.

NAME OF PROPERTY	SITUATION		Name of Lessee	Date of Grant	Registered No. of Lease	REMARKS
	Taluk	District				
Shankargudda Block	Shimoga	Shimoga	The Worthington Iron and Steel Company, Limited	18th July 1913	141	For Manganese.
Kumsi Block	Shimoga	Shimoga	Do	Do	142	Do
Tank Block (Residue)	Bowringpet	Kolar	The Nundydroog Company, Limited	3rd November 1913	143	For Gold. For 27 years with effect from 22nd March 1913.

B.—Assigned.

NAME OF PROPERTY	SITUATION		Registered No. of Lease	Name of Assignor	Name of Assignee	Date of Assignment	REMARKS
	Taluk	District					
			Nil				

C.—Abandoned.

NAME OF PROPERTY	SITUATION		Registered No. of Lease	Name of Lessee	Date of Abandonment	REMARKS
	Taluk	District				
Vadesanudra Block	Seringapatam and Mandya.	Mysore	117	The Bombay Mining Syndicate	26th June 1912	Lease surrendered by the Lessees. Final orders of Government regarding the cancellation of the lease, etc., are yet to issue.

RECORD OF FATAL AND SERIOUS
ACCIDENTS.

—♦—
[MINING.]

RECORD OF FATAL AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
1st January ...	3	The Mysore Gold Mine, Bowringpet Taluk, Kolar District.	8	1	...	1 Periapian ...	20
13th January ...	9	Do ...	12	5	...	1 Ponnammallay ...	35
18th January ...	13	Do ...	14	7	...	1 Samandy ...	19
24th January ...	17	Do ...	20-30	5½	...	1 Vellay ...	26
25th January ...	26	Do ...	11	4	...	1 Muniswami ...	27
25th January ...	18	Do ...	16-30	9	...	1 Chinniah ...	24
30th January ...	22	Do ...	6	7	...	1 Nagan ...	20
11th February ...	34	Do ...	13-40	6½	...	1 V. A. Borgen ...	35
14th February ...	30	Do ...	11	4	...	1 G. Murugan ...	25
15th February ...	32	Do ...	10	3	...	1 Munigadu ...	24
25th February ...	42	Do ...	8	1	...	1 Abdul Kareem ...	35
1st March ...	44	Do ...	9-15	2½	...	1 Papannah ...	37

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913.

Table 13.

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Machine Cooly ...	No. 2 Rise above No. 14 level N. of Main Winze, Ribblesdale's Shaft.	XIX	A burst of quartz ...	Compound fracture of left second toe and wound of third toe.
Hand Jumper Cooly.	Stope, 2,220 foot level N., Ribblesdale's Shaft.	XV	While running to escape from the scene of a severe burst of rock, he slipped and fell into the stope.	Compound depressed fracture of skull with wounds of scalp, left thigh, leg, foot and abdominal wall.
Stuff Cooly ...	No. 1 Stope, 1,650 foot level, Tennant's Shaft.	XIX	While clearing stuff in the stope, a shale of quartz cut his finger against the handle of the shovel.	Wound of right little finger, bone exposed.
Handleman (M. 6,798-B. 4,764).	Sink below No. 1 level, Gilbert's Shaft.	XI	A burst of rock ...	Simple fracture of both bones of left leg and laceration of left heel.
Cooly ...	Near Rowse's Shaft (Surface).	XXIII	While unloading timber from a cart, the crowbar which he was using as a lever dropped on his toe.	Compound fracture of right big toe.
Mestri (M. 7,268-B. 5,154).	No. 5 stope, 1,550 foot level S., Tennant's Shaft.	XIII	Through boring into a socket containing a small amount of blasting gelatine.	Foreign body in both eyes, wound of left eye brow, both forearms, left foot and leg. Laceration of right hand and compound fracture of frontal bone. Right little finger amputated.
Stuff Cooly ...	Sink below No. 1 level, Gilbert's Shaft.	XI	A burst of quartz ...	Compound fracture of right third toe.
Sinker ...	Sink, McTaggart's Vertical Shaft.	XI	While placing a big stone in the bowk, the stone slipped from the chain and caught his finger between the bowk and the chain.	Wound of right middle finger, terminal joint opened.
Cotterman ...	Sink, McTaggart's Vertical Shaft.	XVIII	His finger was jammed by the bit of the drill when starting the machine.	Compound fracture of left middle finger.
Hand Jumper Cooly.	Stope, 3,020 foot level S., Ribblesdale's Shaft.	XIII	Through boring into an old hole containing some blasting gelatine.	Both eyes injured, prolapse of left iris, multiple wounds of face, chest, both forearms and both legs.
Trammer ...	Tramway on the top of ore bins, No. 2 Mill (Surface).	XXII	While pushing a loaded bandy inside the mill house he slipped and fell into the ore bin.	Dislocation of hip joint.
Oil Boy ...	Bandyroad, 1,720 foot level, Ribblesdale's Shaft.	VI	He was thrown from the bandy on which he was being hoisted, owing to its derailment.	Wound penetrating left kneejoint and wounds of left leg and foot.

RECORD OF FATAL AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
9th March ...	46	The Mysore Gold Mine, Bowringpet Taluk, Kolar District —(contd.)	2-35	3 $\frac{7}{8}$	...	1 Palayam ...	20
14th March ...	51	Do ...	20-30	5 $\frac{3}{8}$	...	1 Subrayan ...	28
16th March ...	58	Do ...	2	4	...	1 Perumal ...	26
16th March ...	52	Do ...	17	3	...	1 Munian ...	20
16th March ...	53	Do ...	24	9	...	1 Annamalay ...	25
22nd March ...	56	Do ...	3	4	1 V. Arjunan ...	...	44
1st April ...	61	Do ...	10	3	..	1 Thimaroyan ...	35
8th April ...	67	Do ...	11	4	...	1 Thungamuthu ... (Female)	9
19th April ...	73	Do ...	12-30	5 $\frac{1}{2}$	...	1 Sam ...	45
24th April ...	80	Do ...	7	8	...	1 Chinnaswami ...	17
28th April ...	79	Do ...	16-30	8 $\frac{1}{2}$	...	1 Chinnaswami ...	14
3rd May ...	81	Do ...	12	5	...	1 Kalli ...	30

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—*continued.*

Table 13—*continued.*

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Assistant Blaster	No. 7 level S., Auxiliary Shaft, below the 3,226 foot level, Ribblesdale's Shaft.	XIX	While working in the end, a slab of rock due to a burst fell on his leg.	Compound fracture of both bones of left leg, deep wound of right thigh and skin wounds of right knee and leg and scalp.
Machine Cooly ...	Sink, McTaggart's Vertical Shaft.	XI	While throwing a stone into the bowk it broke into two pieces, one of which fell on his head.	Compound fracture of frontal bone.
Stuff Cooly ...	Skip road, 2,220 foot level, Ribblesdale's Shaft.	X	While working in the skip road a small stone fell from above on his knee.	Wound into left knee joint.
Stuff Cooly ...	1,520 foot level, Gilbert's Shaft.	X	While filling the skip, a stone from the skip road rolled down and struck him on the head.	Compound fracture of skull.
Mestri (M. 4,931 —B. 3,105).	No. 1 Rise, No. 2 level S., Tennant's Shaft.	XIX	A burst of quartz ...	Compound fracture of frontal bone.
Handleman (M. 2,346).	Engine Chamber below No. 8 level, Edgar's Shaft.	XI	Owing to the collapse of the centres of an arch, he was struck by a plank.	Scalp wound, injury to spine, upper dorsals. Died in hospital on 30th March.
Trammer ...	No. 3 Mill (Surface)...	XXII	While coupling the bandy with the hauling rope, his finger was caught between the hook and the rope.	Compound fracture of right little finger.
Cooly ...	Slimes Plant, Cyanide Works (Surface).	XXIII	While carrying a basket filled with wet slime, she slipped on the slime-heap and broke her arm.	Simple fracture of head of right humerus.
Fitter Cooly ...	Near Edgar's Shaft Magazine (Surface).	XXIII	While lifting a piece of timber from off the ground, it slipped and his thumb was caught beneath it.	Compound fracture of right thumb.
Assistant Blaster	No. 1 Rise, 14th level S., Ribblesdale's Shaft.	XIX	While fixing the bar, a shale of quartz, due to a burst, fell on his knee.	Wound of left knee, quadriceps tendon partly cut and joint opened.
Cooly ...	McTaggart's Black Rock Dump (Surface).	XXII	While pushing a bandy round a curve he slipped and the bandy ran over his foot.	Laceration of right foot, great, second and third toes.
Blaster (M. 7,510 —B. 5,343).	No. 4 Stope, 1,250 foot level N. on western branch, Tennant's Shaft.	XIII	Through boring into a socket containing some blasting gelatine.	Right eye destroyed, right hand blown off, front teeth knocked out with compound fracture of upper maxilla, multiple wounds of both legs, knees, left hand and forearm, face and chest. Foreign body in left eye.

RECORD OF FATAL AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Register Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
13th May ...	87	The Mysore Gold Mine, Bowringpet Taluk, Kolar District —(contd.)	12-15	5	1 E. Dasappa ...	...	35
14th May ...	88	Do ...	9-20	2½	...	1 G. Swami ...	30
28th May ...	102	Do ...	8	1	...	1 Muniswami ...	20
15th June ...	117	Do ...	9	2	...	1 Chinnappan ...	28
16th June ...	118	Do ...	9	2	...	1 S. Narayanaswami	25
19th June ...	120	Do ...	14-15	7	...	1 Mahomed ...	25
20th June ...	121	Do ...	10	3	...	1 Moothan ...	28
22nd June ...	122	Do ...	12	17	...	1 Nathamuny ...	36
26th June ...	129	Do ...	13	6	...	1 Chadayan ...	22
27th June ...	130	Do ...	11-55	4½	...	1 Muthuswami ...	19
9th July ...	136	Do ...	13	6	1 Ganapathy ...	...	28
						1 Subran alias Narayanaswami.	24

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—continued.

Table 13—continued.

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Timber Mestri (M. 5,269—B. 3,406).	Stope, 1,560 foot level, McTaggart's Shaft.	XV	When filling a stope with waste rock, a piece of rock on which he was standing slid down the footwall and caused him to fall 12 feet down the stope.	Neck broken.
Cotterman ...	McTaggart's Vertical Shaft.	VI	While riding up the shaft in the bucket, his arm was caught against the sinking frame.	Deep wound of right upper arm with biceps and triceps divided.
Stuff Cooly ...	Drive, 2,120 foot level N., Ribblesdale's Shaft.	XIX	While filling a bandy from the shoot, a stone fell on his finger.	Compound fracture of left ring finger.
Stuff Cooly ...	Plat, 3,010 foot level, McTaggart's Shaft.	XI	While tipping a bandy in the shoot, a stone fell on his foot.	Compound fracture of right second and third toes.
Black Rock Cooly	Drive, 2,520 foot level S., Ribblesdale's Shaft.	XIX	A burst of rock ...	Severe laceration of right calf muscles and wound of back.
Timber Cooly ...	60 feet below surface Gilbert's Shaft.	II	While working on a stage, it collapsed owing to a heavy fall of loose ground and his leg was caught between the stage timbers.	Simple fracture of lower third of right tibia.
Machine Cooly ...	Skip road above the 3,020 foot level plat, Edgar's Incline Shaft.	XI	While stripping the foot wall, a shale from the hanging wall, due to a burst, fell on his foot.	Severe laceration of left heel, tendo achilles completely cut and ankle joint opened.
Hand Jumper Cooly.	No. 1 Stope, 1,350 foot level N., Tennant's Shaft.	XIX	While picking up loose in the stope, a small stone flew and struck him in the eye.	Cornea torn, iris prolapsed and traumatic cataract.
Stuff Cooly ...	Drive, 1,350 foot level S., Tennant's Shaft.	XIX	An air blast ...	Wound of left tendo achilles, tendon completely cut.
Stuff Cooly ...	Drive, 1,650 foot level, Tennant's Shaft.	XIX	An air blast ...	Compound fracture of skull and wounds of neck and left leg.
Cotterman ...	Sink, Main Winze, Ribblesdale's Shaft.	XIII	Through boring into the bottom of an old hole which contained some blasting gelatine.	Compound depressed fracture of right frontal bone and laceration of brain and wounds of forehead and face. Died in hospital on 15th July.
Do ...	Do ...	Do	Do ...	Multiple wounds of face and forehead, foreign bodies in both eyes, teeth knocked out.

RECORD OF FATAL

AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
17th July ...	144	The Mysore Gold Mine, Bowringpet Taluk, Kolar District —(contd.)	16-30	9	...	1 Narayanaswami	26
8th August ...	158	Do ...	8	1	...	1 Munivenkatappa	35
12th August ...	164	Do ...	23-30	1½	...	1 Valan ...	39
19th August ...	169	Do ...	17-30	10½	...	1 Thungavaloo ...	38
20th August ...	170	Do ...	9	2	...	1 Samoo ...	26
21st August ...	177	Do ...	7-5	...	42 Suardini Alessandro.	...	36
					Carzana Giovanni	...	50
					Suardini Antonio	...	29
					Bonetti Angelo...	...	28
					Pressti Onesto ...	...	24
					Dell'Angelo Francesco.	...	25
					Henry Allen ...	...	33
					J. L. D'Cruz ...	...	37
					Michael ...	...	45
					Ponnurungam ...	...	30
					Vellay ...	...	40
					Kundaswami ...	...	40
					Iyakannu ...	...	28

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—*continued.*

Table 13—*continued.*

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Hand Jumper Cooly.	No. 3 Stope, 2,920 foot level N., Ribblesdale's Shaft.	XIII	Through drilling into a socket containing some blasting gelatine.	Compound fracture of left fourth and fifth metacarpals and multiple wounds of both legs and knees, peppered wounds of right arm and chest.
Black Rock Cooly	Picking Floors (Surface).	XXIII	While filling a bandy from a shoot, a stone fell upon his head.	Compound fracture of frontal bone.
Stuff Cooly ...	Drive, 750 foot level N., Hancock's Shaft.	XVII	While tramming stuff, the bandy derailed and caught his finger against the side of the drive.	Compound fracture of right index finger.
Hand Jumper Cooly.	Stope, 1,250 foot level, Tennant's Shaft.	XV	While climbing up the stope, he slipped and fell back into the level below.	Simple fracture of right clavicle and wound of forehead and right thigh.
Hand Jumper Cooly.	Breast stope 2,320 foot level, Ribblesdale's Shaft.	XIX	A burst of quartz ...	Wound of right leg. Tendo achilles cut completely.
Timberman ... (M. 6,866).	Edgar's Shaft ...	VI	The draw bar of the clutch band of one reel of the winding engine broke, causing the cage to fall to the bottom of the shaft.	Killed instantaneously.
Timberman ...	Do ...	Do	Do ...	Do
Do ... (M. 6,946—B. 4,881).	Do ...	Do	Do ...	Do
Timberman ...	Do ...	Do	Do ...	Do
Do ...	Do ...	Do	Do ...	Do
Do ...	Do ...	Do	Do ...	Do
Stuff Miner ... (M. 6,507—B. 4,544).	Do ...	Do	Do ...	Do
Stuff Miner ... (M. 1,700).	Do ...	Do	Do ...	Do
Donkey Driver ...	Do ...	Do	Do ...	Do
Timber Cooly ...	Do ...	Do	Do ...	Do
Timber Mestri ... (M. 6,638).	Do ...	Do	Do ...	Do
Platelayer ...	Do ...	Do	Do ...	Do
Timber Cooly ...	Do ...	Do	Do ...	Do

RECORD OF FATAL AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
21st August (contd.)	177	The Mysore Gold Mine, Bowringpet Taluk, Kolar District (contd.)	7-5	...	K. Venkatapah...	...	40
					Pusulingam ...	...	35
					Chengalrayan ...	...	32
					Manickam ...	...	25
					Anthoo ...	...	21
					Syed Hussain ...	...	28
					Ameer Sahib ...	...	26
					Chinnian ...	...	26
					Tom ...	...	35
					Rangaswami ...	...	22
					Ruthnam ...	...	32
					Chinnathambi ...	...	33
					Thimmapah ...	...	25
					Yellan.. ...	...	27
					Kuppan ...	...	25
					Michael ...	...	35
					Raghavalu Naidu	...	35
					Kanagu ...	...	37
					Amavasay ...	...	38
					Mottay ...	...	45
					Varadha ...	...	28
					Kanniah ...	...	26
					Govindan ...	...	30

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—*continued.*

Table 13—*continued.*

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Timber Mestri ... (M. 2,871).	Edgar's Shaft ...	VI	The draw bar of the clutch band of one reel of the winding engine broke, causing the cage to fall to the bottom of the shaft.	Killed instantaneously.
Carpenter Mestri (M. 4,651—B. 2,784).	Do ...	Do	Do ...	Do
Timber Cooly ...	Do ...	Do	Do ...	Do
Black Rock Cooly	Do ...	Do	Do ...	Do
Donkey Boy ...	Do ...	Do	Do ...	Do
Timber Cooly ...	Do ...	Do	Do ...	Do
Platelayer Mestri (M. 7,231).	Do ...	Do	Do ...	Do
Hand Jumper Cooly.	Do ...	Do	Do ...	Do
Donkey Fitter ...	Do ...	Do	Do ...	Do
Stuff Mestri ... (M. 7,653—B. 5,461).	Do ...	Do	Do ...	Do
Donkey Pump Driver.	Do ...	Do	Do ...	Do
Stuff Cooly ...	Do ...	Do	Do ...	Do
Timber Cooly ...	Do ...	Do	Do ...	Do
Hand Jumper Mestri. (M. 6,862).	Do ...	Do	Do ...	Do
Stuff Cooly ...	Do ...	Do	Do ...	Do
Bell Boy ...	Do ...	Do	Do ...	Do
Do ...	Do ...	Do	Do ...	Do
Black Rock Cooly	Do ...	Do	Do ...	Do
Timber Cooly ...	Do ...	Do	Do ...	Do
Winding Driver...	Do ...	Do	Do ...	Do
Timber Cooly ...	Do ...	Do	Do ...	Do
Black Rock Cooly	Do ...	Do	Do ...	Do
Do ...	Do ...	Do	Do ...	Do

RECORD OF FATAL AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
21st August (contd.)	177	The Mysore Gold Mine, Bowringpet Taluk, Kolar District (contd.)	7-5	...	Ramaswami ...	...	37
					Krishnappah ...	...	40
					Murugadu ...	...	35
					Venkatapah ...	...	26
					K. Runga ...	...	25
					and		
					Chellan ...	...	30
22nd August	178	Do	1-50	2½	1 C. Stephens ...	...	50
23rd August	179	Do	9-30	10½	...	1 Veeraswami ...	38
25th August	181	Do	9-30	2½	...	1 Perumal ...	17
28th August	184	Do	10	4	...	1 Varadan ...	18
29th August	186	Do	21-45	6¾	...	1 P. Muniswami ...	35
15th September...	197	Do	10-45	3¾	...	1 Kullagadu ...	35
18th September...	202	Do	11	12	...	1 Perumal ...	42
19th September...	204	Do	11	4	...	1 Kulla ...	22

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—continued.

Table 13—continued.

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Timber Mestri ... (M. 2,885).	Edgar's Shaft ...	VI	The draw bar of the clutch band of one reel of the winding engine broke, causing the cage to fall to the bottom of the shaft.	Killed instantaneously.
Timber Mestri ... (M. 1,674).	Do ...	Do	Do ...	Do
Timber Cooly ...	Do ...	Do	Do ...	Do
Stuff Cooly ...	Do ...	Do	Do ...	Do
Timber Cooly ...	Do ...	Do	Do ...	Do
Do ...	Do ...	Do	Do ...	Do
Shift Boss ...	Drive, 2,000 foot level N., Tennant's Shaft.	I	Struck by a piece of rock which fell from the hanging wall.	Compound depressed fracture of skull (left parietal bone), cerebral compression. Died in hospital on 22nd August.
Blaster ... (M. 5,633—B. 3,706).	Rise, 2,120 foot level, McTaggart's Shaft.	XIX	While fixing the machine in the rise, a shale of quartz, due to a burst, fell on his foot.	Wound of right tendo achilles; tendon completely cut.
Stuff Cooly ...	Stope, 2,720 foot level S., Rowse's Shaft.	XIX	While clearing stuff in the stope, a shale of quartz, due to a burst, fell on his toe.	Compound fracture of right fourth toe.
Stuff Cooly ...	Plat, 3,010 foot level, McTaggart's Shaft.	XI	The crow bar, with which he was levering a derailed bandy, slipped and jammed his finger against a stone.	Compound fracture of left middle finger.
Cotterman ...	Sink, below No. 7 level, Edgar's Shaft.	XI	While pushing the ladder away from off the skip, it slipped and jammed his finger against the edge of the skip.	Compound fracture of left ring finger.
Assistant Blaster	Drive, 2,820 foot level N., Ribblesdale's Shaft.	XIX	An air blast ...	Simple fracture of right collar bone, wounds of both thighs, arms and back. Compound fracture of skull.
Donkey Pump Driver.	In the bandy road about 250 feet below surface, Crocker's Shaft.	VI	While riding up in the bandy, he lost his seat and fell, the bandy running over his thigh.	Compound fracture of left thigh bone and deep wounds round left knee.
Stuff Cooly ...	Drive, 2,820 foot level S., Rowse's Shaft.	XIX	While clearing stuff in the level, a burst of rock occurred in the stope above a shale falling and striking him on the head.	Compound fracture of skull.

RECORD OF FATAL AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
27th September...	209	The Mysore Gold Mine, Bowringpet Taluk, Kolar District —(contd.)	17-30	2½	1. Murugase ...	...	33
						1 Peria Abboo alias Megale.	35
2nd October ...	214	Do ...	9	2	...	1 Veeraswami ...	30
7th October ...	216	Do ...	13-5	6	...	1 Murugase ...	40
16th October ...	227	Do ...	13-30	5½	...	1 Kassim Saib ...	20
16th October ...	226	Do ...	14-30	7	...	2 Ponnuswami ...	30
						and	
						Shoolay ...	28
29th October ...	233	Do ...	12-30	5½	...	1 Munian ...	16
10th November ...	246	Do ...	9	2	...	2 Thandrayan ...	22
						and Abdul Rahiman...	38

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—continued.

Table 13—continued.

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Cotterman ...	Drive, No. 5 level, Rowse's Shaft.	XIII	Through boring into a socket containing a portion of a charge of blasting gelatine.	Compound fracture of left femur, compound fracture of left humerus (amputation) and wounds of forehead, right forearm. Died in hospital on 28th September.
Handleman ...	Do ...	Do	Do ...	Compound fracture of forehead, compound fracture of left tibia and wounds of scalp, neck and left forearm.
Skip Road Cooly	Skip road below the 5th level, Ribblesdale's Auxiliary Shaft.	VIII	While working in the skip road, the descending skip struck and knocked him down the shaft.	Compound fracture of skull, right index finger, wound of left upper arm. Biceps completely cut and wound of forehead, left eyelid, right knee and foot.
Timber Cooly ...	Stope, 2,320 foot level, Crocker's Shaft.	XIX	A burst of rock ...	Compound fracture of both bones of left leg and wound of right foot.
Spare Cooly ...	Cyanide Works (Surface).	XXIII	While loading a fly wheel in the cart, his finger was jammed between the wheel and the cart.	Compound fracture of left ring finger (amputated).
Cotterman ...	Sink, below 13th level, Ribblesdale's Shaft.	XIII	Through drilling into the bottom of an old hole containing a small quantity of blasting gelatine.	Compound fracture of frontal bone, injury to eye, peppered wounds of abdomen and both legs.
Do ...	Do ...	Do	Do ...	Penetrating wound of chest, with compound fracture of sternum, peppered wounds all over body.
Hand Jumper Cooly.	No. 1 stope, 1,750 foot level S., Tenant's Shaft.	XIII	Through boring into a socket containing some blasting gelatine.	Compound fracture of right upper arm (amputation). Compound fracture of skull, wounds of face, chest, left forearm and middle finger.
Hand Jumper Cooly.	No. 4 stope, 1,960 foot level, McTaggart's Shaft.	XIX	A burst of quartz ...	Compound fracture of frontal bone, wound of face.
Do ...	Do ...	Do	Do ...	Compound fracture of left frontal bone, wound of scalp, left wrist and ring finger.

RECORD OF FATAL AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
13th November...	247	The Mysore Gold Mine, Bowringpet Taluk, Kolar District—(concl'd.)	16	1½	...	1 C. Kanthan ...	30
15th November...	253	Do ...	11	4	...	1 Chinnagan ...	28
18th November...	255	Do ...	11	4	...	1 Periathayee (Female).	45
29th November...	262	Do ...	11-20	4½	...	1 C. Jaganathan ...	22
2nd December...	263	Do ...	9-15	2½	...	1 T. Muniswami ...	26
5th December ...	271	Do ...	21	6	...	1 Chinnappan alias Manickum.	24
5th December ...	274	Do ...	21	6	...	1 Lutchmanan ...	31
8th December ...	270	Do ...	13	6	...	1 Chowry ...	25
10th December ...	275	Do ...	18	4	...	1 Muniswami ...	25
16th December ...	278	Do ...	21-30	2½	...	1 Chintamany alias Hanuman.	35
18th December ...	283	Do ...	21-40	7	1 Ramaswami ...	...	42

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—continued.

Table 13—continued.

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Stuff Cooly ...	No. 1, stope, 1,660 foot level, McTaggart's Shaft.	I	A piece of loose rock from the hanging wall of the stope fell on his leg.	Compound fracture of right patella and tibia opening into knee joint. Wounds of right shin, great toe, left knee and shin, compound fracture of fourth and fifth toes.
Mestri (M. 7,841—B. 5,613)	Plat, Edgar's Incline Shaft.	XIII	By drilling into a socket containing a small quantity of an unexploded charge of gelatine.	Lacerated wounds of left hand, ring and little fingers off, metacarpals amputated, wound of head, and foreign bodies in both eyes.
Cooly ...	Tram line, Cyanide Works (Surface).	XXII	While attempting to cross the tram line, a bandy ran over her foot.	Compound fracture of right great toe and wound of leg.
Boilersmith's Assistant.	Boiler shop (Surface).	XXIII	While chipping an iron plate a small piece struck him in the eye.	Foreign body in left eye.
Handleman (M. 4,189—B. 2,133)	Sink, McTaggart's Vertical Shaft.	XI	A burst of rock ...	Compound depressed fracture of skull.
Pipe Fitter ...	Ladderway below the 3,177 foot level, McTaggart's Shaft.	XI	While going down by ladder, he slipped and struck his shoulder against the hand rail.	Fracture of left clavicle.
Stuff Cooly ...	Drive, 950 foot level, Tennant's Shaft.	XV	While tipping stuff into the shoot, a stone struck him on the head and knocked him down the shoot pass.	Wound of scalp, bone exposed, wound of left forearm, tendons cut and wound of face and ankle.
Timber Cooly ...	Plat, No. 2 level, below the 3,226 foot level N., Tennant's Shaft.	XI	While cutting a hitch, a small stone struck him in the eye.	Penetrating wound of right eye, escape of vitreous.
Lander ...	McTaggart's Vertical Shaft (Surface).	XXIII	While tipping a bowk of stuff into the bandy, a small stone hit him in the eye.	Neglected wound of left eye, protrusion of the iris.
Head Mestri (M. 2,951).	Stope, 450 foot level S., Tennant's Shaft.	XV	While going up the stope, a stone rolled down and struck him on the leg.	Compound fracture of left tibia.
Stuff Cooly ...	No. 1 Winze below No. 10 level, Ribblesdale's Shaft.	XIX	While climbing up by ladder, he made a false step and cut his leg against the projecting portion of the iron rung.	Deep and extensive wound of right leg, bone exposed. Died of tetanus in hospital on 27th December.

RECORD OF FATAL AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
11th January ...	4	The Champion Reef Gold Mine, Bowringpet Taluk, Kolar District.	11	4	1. Govindaswami...	...	35
15th January ...	10	Do	13	10	...	1 Kuppan ...	50
18th January ...	12	Do	12-30	3½	...	1 Chockalingam ...	32
26th January ...	19	Do	10	3	...	1 Arlandoo ...	10
30th January ...	23	Do	13	6	...	1 Murugan ...	17
10th February ...	28	Do	10-30	3½	...	1 Muniswami ...	12
15th February ...	33	Do	19	3	...	1 Munian ...	30
17th February ...	36	Do	12	5	...	1 Kanikam ... (Female)	19
22nd February ...	41	Do	15-15	7	1. Vadee ...	...	40
12th March ...	48	Do	20-30	4½	1. P. Chengalrayan.	...	24
23rd March ...	57	Do	15-50	½	...	1 Veeraswami ...	45
1st April ...	64	Do	14-30	7½	...	1 Jimmy ...	25

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—*continued.*

Table 13—*continued.*

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Black Stone Cooly.	Ladderway, 34th level, Glen Shaft.	VIII	Probably slipped from the ladder when climbing down the shaft.	Compound fracture of right tibia, fibula, wounds of scalp (bone exposed) and nose. Died in hospital on 12th January.
Handleman (M. 4,187—B. 2,131)	Sink, below 33rd level, Tennant's Incline Shaft.	XI	A burst of rock ...	Compound fracture of skull.
Handleman (M. 6,910—B. 4,850)	Rise, 16th level, Carmichael's Shaft.	XIX	A burst of quartz ...	Compound fracture of left thumb and wound of right knee.
Point Boy ...	Tram line near Tennant's Shaft (Surface).	XXII	His toe was jammed between the frames of two adjacent handies.	Compound fracture of right little toe.
Trammer ...	Otto Ropeway, Cyanide Works (Surface).	XXII	While guiding the bucket round a curve, it fell off the rail and caught his thumb against the ground.	Compound fracture of left thumb.
Brake Boy ...	Tram line near Captain Treloar's bungalow (Surface).	XXII	While attempting to board a train of empty coal trucks which was in motion, he slipped and fell across the tram line.	Simple fracture of left humerus and injury to abdomen.
Stuff Cooly ...	Drive S., 43rd level, Carmichael's Shaft.	XIX	A burst of quartz ...	Compound fracture of skull.
Cooly ...	Circular Shaft new buildings (Surface).	XXIII	While dragging a cart, her thumb was caught between the yoke and its bracket.	Compound fracture of left thumb (amputated).
Mestri (M. 1,205).	Stope, 30th level, Garland's Shaft.	XIII	While removing loose quartz with a bar, he caused some gelatine in the bottom of an old hole to explode.	Compound fracture of both bones of right leg, wound of thigh. Compound fracture of left little finger, wounds of both hands right forearm and chest. Hæmorrhage and shock. Died in hospital the same day.
Stuff Cooly ...	Drive N., 16th level, Carmichael's Shaft.	XIX	While clearing stuff in the drive, a shale of quartz, due to a burst, fell on his foot.	Compound fracture of left big toe. Died of tetanus in hospital on 25th March.
Skip Road Cooly..	Plat, 13th level, Tennant's Vertical Shaft.	XI	While unloading a piece of timber from the skip, his finger was jammed between it and the rim of the skip.	Compound fracture of right index finger and contusion of middle and ring fingers.
Handleman ...	Bottom of new Circular Shaft.	XI	While steadying the bucket in the sink, it struck him on the hip.	Injury to right hip.

RECORD OF FATAL

AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
4th April ...	63	The Champion Reef Gold Mine, Bowringpet Taluk, Kolar District—(contd.)	8-30	...	...	1 Ponnann ...	30
15th April ...	70	Do ...	14-30	6½	...	1 Ammayee ... (Female)	20
18th April ...	74	Do ...	10-30	3½	...	2 P. Munian and Munian ...	35 35
19th April ...	75	Do ...	14-30	6	1 V. Munian ...	...	19
27th April ...	77	Do ...	15	7	...	1 S. Velayutham ...	45
10th May ...	84	Do ...	11	3	...	1 Kaveri ...	25
19th May ...	92	Do ...	23-15	4½	...	1 S. Arbutham ...	18
20th May ...	96	Do ...	7-30	...	...	1 Appoo ...	25
20th May ...	95	Do ...	10	2	...	1 V. Perumal ...	18
23rd May ...	97	Do ...	9	1	...	1 Venkoji Rao ...	22
26th May ...	98	Do ...	11-10	3½	3 Periaswami ...	...	28

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—continued.

Table 13—continued.

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Hand Jumper Cooly.	Stope, 16th level, Carmichael's Shaft.	XIX	A burst of rock ...	Fracture of external malleolus-compound dislocation of right ankle and wound of right knee.
Mason's Cooly ...	New bungalow buildings near Circular Shaft (Surface).	XXIII	While carrying two building stones on her head, one of them dropped on her toe.	Compound fracture of left little toe and scalp wound.
Hand Jumper Cooly.	Stope, 29th level S., Garland's Shaft.	XIII	By working into a socket containing a small quantity of an unexploded charge.	Peppered wounds of face, left arm, both hands and left leg; foreign bodies in both eyes.
Do ...	Do ...	Do	Do ...	Wound of scalp, peppered wounds of face, chest, right hand, left thumb and middle finger, right thigh and leg; foreign bodies in both eyes.
Black Stone Cooly	Ladderway below 8th level, Carmichael's Shaft.	VIII	While climbing up the shaft, he slipped and fell from the ladder.	Fracture of skull and cut on the left chest. Died the same day.
Trammer ...	Quartz yard at foot of Mill Incline (Surface).	XXII	While adjusting the shackle on a truck at the foot of the mill incline, another bandy came down and jammed his leg between the frames of the two bandies.	Compound fracture of left leg. Amputated.
Black Stone Cooly	Drive N., 24th level, Garland's Shaft.	XVII	While tipping a bandy into the stope, his finger was caught between it and the hanging wall.	Compound fracture of left little finger and wound of ring finger.
Fitter Cooly ...	Fitting shop (Surface).	XX	While slotting a pipe on the slotting machine, he laid hold of the tool slide and cut his fingers against the slide face.	Compound fracture of four inner fingers of right hand.
Hand Jumper Cooly.	Stope, 28th level, Ribblesdale's Shaft.	I	A fall of rock from the hanging wall ...	Compound dislocation of left ankle.
Timber Cooly ...	Winze, 33rd level, Rowe's Shaft.	XV	While climbing down the ladder in a winze, it gave way and he fell into the level below.	Compound depressed fracture of skull.
Timber Cooly ...	Drive N., 35th level, Tennant's Incline Shaft.	XVII	While pushing a bandy round a curve, it swung over and caught his fingers against the side of the drive.	Compound fracture of right middle and ring fingers.
Timber Cooly ...	Winze, 25th level, Rowe's Shaft.	XIX	An air blast ...	Cut on head and both thighs.

RECORD OF FATAL AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
26th May (concl'd.)	98	The Champion Reef Gold Mine, Bowringpet Taluk, Kolar District--(cont'd).	11-10	36	Maduray ... and Chinnathamby ...	... ...	26 24
27th May	100	Do	17	2	...	1 Mottay	25
28th May	103	Do	12-30	4½	...	1 V. Munian	45
30th May	104	Do	9	1	...	1 V. Shaik Dawood	48
30th May	105	Do	20-30	4½	...	1 Rayappan	26
6th June	109	Do	16-50	1½	...	1 P. Munian	35
9th June	110	Do	18	2	...	1 N. Narasiah	30
12th June	115	Do	11-30	3	...	1 Kandan	40
16th June	116	Do	11	3	2 Varadan and Muniswami	... ...	35 25
						1 Raghavan	32

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—*continued.*

Table 13—*continued.*

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Hand Jumper Cooly.	Winze, 25th level, Rowe's Shaft.	XIX	An air blast ...	Completely crushed.
Timber Cooly ...	Do ...	Do	Do ...	Compound fracture of right clavicle with traumatic emphese-ma, multiple wounds of both legs, right knee, left thigh, face and scalp, and collapse. Died in hospital on 27th May.
Skip Road Cooly	Capstan road, 17th level, Tennant's Vertical Shaft.	XI	While closing the door of the capstan road, it slipped and fell on his toes.	Compound fracture of left great toe and wound of second toe.
Stuff Cooly ...	Ore shoot, 28th level, Tennant's Incline Shaft.	XI	While tipping stuff into the shoot pass, a stone from the bandy fell on his hand.	Compound fracture of left middle and simple fracture of index fingers.
Black Stone Cooly	Drive, 27th level S., Ribblesdale's Shaft:	XIX	A burst of quartzz ...	Compound fracture of right third and fourth toes.
Skip Road Cooly	Capstan road, 17th level, Tennant's Vertical Shaft.	XI	While opening the capstan door, it slipped out of his hand and dropped on his toes.	Compound fracture of right second and third toes and wounds of first and fourth toes.
Stuff Cooly ...	Drive, 31st level S., Glen Shaft.	XIX	While building a dry stone wall, a stone slipped and fell on his finger.	Compound fracture of right ring finger.
Stuff Cooly ...	Plat, 29th level, Carmichael's Shaft.	XI	While filling a bandy from the shoot, a stone dropped on his finger.	Wound of right index finger and compound fracture of middle finger.
Stuff Cooly ...	Sink, below 42nd level, Glen Shaft.	X	While working in the sink, a stone from the skip road fell on his hand.	Compound fracture of left third and fourth metacarpals with extensor tendons cut.
Oil Boy ...	Skip road, 35th level, Carmichael's Shaft.	XI	When working in the skip road, they were struck by the descending skip.	Both legs smashed.
Do ...	Do ...	Do	Do ...	Simple fracture of left humerus, scalp wound and severe shock. Died in hospital the same day.
Do ...	Do ...	Do	Do ...	Compound fracture of left ulna, radius and right thumb. Left forearm amputated.

RECORD OF FATAL AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
16th June ...	119	The Champion Reef Gold Mine, Bowringpet Taluk, Kolar District—(contd.)	11-30	4½	...	1 B. Tambi ...	14
19th June ...	124	Do ...	13	5	...	1 Raghavan alias Kakha.	47
20th June	125	Do ...	12	4	...	1 Kuttoney Nair ...	35
20th June ...	126	Do ...	15	8	...	1 S. Kundaswami.	22
24th June ...	127	Do ...	8-35	1	12 G. Munian ...	...	55
					V. Chinnan ...	...	45
					O. Kullan ...	...	...
					P. Munian ...	...	...
					V. Muthan ...	...	...
					V. Kunthan ...	...	...
					T. Raman ...	...	...
					Chinnathamby	...	...
					Singaram ...	...	...
					Kullan ...	...	...
					Chinniah and O. Muniswami	...	...
						1 V. Muniswami ...	38
5th July	133	Do ...	10	1½	...	1 Manickam ...	25

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—continued. Table 13—continued.

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Brake Boy ...	Tram line (Surface).	XXII	While applying the brake on the coal truck, his finger was caught under the lever.	Compound fracture of right middle finger.
Stuff Mestri ... (M. 4,536—B. 2,634).	Shoot, 28th level, Ribblesdale's Shaft.	XIX	While raking stuff in the shoot with a long bar, a stone rolled down and hit him on the chin.	Compound fracture of lower jaw.
Handleman ...	Winze, 42nd level, Glen Shaft.	XV	While bringing down loose in the winze, a stone fell on his toe.	Compound fracture of right great toe.
Fitter ...	No. 1 Mill (Surface).	XX	While working on the feeder platform, a finger post socket fell on his finger.	Compound fracture of right little finger.
Hand Jumper Cooly.	Stope, 25th level, Ribblesdale's Shaft.	XIX	An air blast	Injuries to left shoulder and right thigh and small wounds all over the body.
Do ...	Do ...	Do	Do ...	Cut on the head, left shin broken and wound on the back.
Do ...	Do ...	Do	Do ...	Instantaneous death.
Do ...	Do ...	Do	Do ...	Do
Do ...	Do ...	Do	Do ...	Do
Do ...	Do ...	Do	Do ...	Do
Do ...	Do ...	Do	Do ...	Do
Timber Mestri ... (M. 7,191—B. 5,106).	Do ...	Do	Do ...	Do
Timber Cooly ...	Do ...	Do	Do ...	Do
Do ...	Do ...	Do	Do ...	Do
Do ...	Do ...	Do	Do ...	Do
Do ...	Do ...	Do	Do ...	Do
Hand Jumper Cooly.	Do ...	Do	Do ...	Compound fracture of skull and lower end of left radius, multiple wounds of scalp, both knees and left ankle and hand.
Timber Cooly ...	Main Winze, 41st level, Rowe's Shaft.	XIX	An air blast or burst of rock	Wounds of right leg, little toe, heel and left knee, bruise of left shoulder and chest and compound fracture of skull.

RECORD OF FATAL AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
6th July ...	134	The Champion Reef Gold Mine, Bowringpet Taluk, Kolar District—(contd.)	13	5	...	1 A. Chinnian ...	35
13th July ...	137	Do ...	8-30	2½	...	1. P. Thola ...	21
16th July ...	139	Do ...	10-20	3½	1 J. Vadee ...	...	35
20th July ...	140	Do ...	19-30	½	...	1 Murugan ...	25
25th July ...	147	Do ...	12	4	...	1 U. Veloo ...	28
25th July ...	148	Do ...	12-45	3¾	...	1 P. Govindan ...	25
31st July ...	151	Do ...	6	7	1 A. J. Hensby ...	...	36
3rd August ...	153	Do ...	20	4	...	1 Perumal ...	26
5th August ...	154	Do ...	11-30	3½	1 B. Muniswami ...	...	30
						1 Murugan ...	28
5th August ...	155	Do ...	13-30	5½	...	1 Raman ...	22
8th August ...	159	Do ...	7-40	1	...	1 Balaramsingh ...	30

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—continued.

Table 13—continued.

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Skip Road Cooly...	Crosscut, 40th level, Carmichael's Shaft.	XIX	While taking a plank from a pile, another plank fell upon his finger.	Compound fracture of right middle finger.
Trammer ...	No. 2, Cyande discharge pile (Surface).	XXII	A loaded bandy which he was pushing became derailed and fell upon his leg.	Compound fracture of both bones of left leg.
Hand Jumper Cooly.	Stope, 31st level, Garland's Shaft.	XIII	While levering up with a bar quartz shaken by blasting, there was an explosion of blasting gelatine.	Wound of left side of neck, jugular vein cut. Compound incomplete fracture of left clavicle and first rib, compound fracture of left ulna and multiple wounds of face, chest, both hands and forearms and left knee. Died in hospital on 29th July.
Cotterman ...	Sink, below the 46th level, Carmichael's Shaft.	XI	While clearing stuff in the sink, a shale of rock, due to a burst, fell on his foot.	Wound over left tendo achilles, tendon completely cut.
Hand Jumper Mestri (M. 6,176—B. 4,262).	Stope, 28th level, Ribblesdale's Shaft.	XIX	While taking down loose, a stone fell upon his head.	Compound fracture of skull.
Hand Jumper Cooly.	Stope, 30th level, Garland's Shaft.	XIX	A burst of rock.	Compound fracture of frontal bone, wound of back and right knee.
Stuff Miner ...	Small skip road, 40th level, Carmichael's Shaft.	VI	Having given the signal to hoist the cage, he was stepping into it when it was hoisted and his head struck against the shaft timbers.	Head crushed.
Skip Road Cooly	Skip road, 20th level, Tennant's Vertical Shaft.	VIII	While working in the shaft, he fell for six feet upon a staging.	Compound fracture of frontal bone.
Skip Road Mestri (M. 7,382—B. 5,244).	26th level, Rowe's Shaft.	X	Struck by a piece of timber which fell down the ladder way of the shaft.	Neck and both thighs broken.
Skip Road Cooly	Do ...	Do	Do ...	Compound fracture of skull, wounds of right elbow, and injury to back.
Handleman (M. 7,619—B. 5,436)	Crosscut, 46th level, Carmichael's Shaft.	XIX	A burst of rock	Wound of right tendo achilles, tendon completely cut.
Trammer ...	No. 1, Cyanide Works, Otto ropeway (Surface)	XXII	While pushing an empty bucket round a curve it left the rail and fell upon his foot.	Compound comminuted fracture of left little toe and wound of foot.

RECORD OF FATAL AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
9th August ...	167	The Champion Reef Gold Mine, Bowringpet Taluk, Kolar District—(contd.)	13-45	5½	...	1 Venkatigadu ...	18
13th August ...	165	Do ...	11	4	...	1 Madoo ...	23
20th August ...	173	Do ...	12	5	...	1 Venkatachallam...	25
20th August ...	174	Do ...	21	13	8 T. Annamalay ...	...	29
				5	C. Arumugam ...	...	50
				5	C. Munian ...	...	35
				13	Vadee alias Patchappen.	...	28
				13	S. Chinnapayan	...	18
				5	N. Chinnappan...	...	30
				13	Goovaran ...	...	20
				5	A. Ramaswami...	...	28
				5	...	6 S. Manickam ...	35

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—*continued.*

Table 13—*continued.*

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Stuff Cooly ...	Shoot, 37th level, Carmichael's Shaft.	XIX	While filling the bandy from the shoot, a stone dropped on his foot.	Compound fracture of left fourth toe ungual phalanx.
Stuff Cooly ...	Drive, 16th level, Carmichael's Shaft.	XVII	While tramping stuff, the bandy derailed and caught his hand against a piece of timber.	Compound comminuted fracture of right little finger.
Timber Mestri ... (M. 6,276).	Stope, 35th level, Glen Shaft.	XIX	A burst of quartzz ...	Wound of left wrist, all extensortendons completely cut.
Handleman ...	Sink, Carmichael's Shaft.	XI	An air blast in the footwall of the shaft.	Bowels protruding.
Stuff Cooly ...	Do ...	Do	Do ...	Cut on the head and both hands broken.
Do ...	Do ...	Do	Do ...	Neck broken.
Handleman ... (M. 3,776).	Do ...	Do	Do ...	Wound of right upper arm and forearm, much bruising of body and foot, and extreme collapse and pulseless. Died in hospital on 21st August.
Bar Cooly ...	Do ...	Do	Do ...	Internal injuries, wounds of right knee, foot and little toe. Patient collapsed and pulseless. Died in hospital on 21st August.
Stuff Cooly ...	Do ...	Do	Do ...	Deep lacerated wound over buttocks and sacrum, wounds of left foot and leg. Died in hospital on 29th August.
Bar Cooly ...	Do ...	Do	Do ...	Wound of right shin, compound fracture of left femur, injury to hip and chest. Died in hospital on 22nd August.
Stuff Cooly ...	Do ...	Do	Do ...	Wound of face, contusion all over body and shock. Died in hospital on 22nd August.
Stuff Mestri ... (M. 2,019).	Do ...	Do	Do ...	Compound fracture of skull, wounds of right foot and leg, bone exposed.

RECORD OF FATAL AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
20th August ... (contd.)	174	The Champion Reef Gold Mine, Bowringpet Taluk, Kolar District—(contd.)	21	5	...	Rajagopal ...	25
				5	...	Abboy ...	32
				13	...	Vellay ...	20
				5	...	V. Ponnann ...	36
				5	...	and Authimulam ...	30
20th August ...	175	Do ...	21-30	5½	...	1 A. Rangaswami...	25
21st August ...	176	Do ...	12-30	12	1 A. Alban ...	...	36
28th August ...	185	Do ...	14	6	...	1 Muniswami ...	40
6th September...	190	Do ...	10-45	2½	...	3 Jamal ...	19
						Kutty Athan ...	21
						and Kunjee Ahmed...	30

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—continued.

Table 13—continued.

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Stuff Cooly ...	Sink, Carmichael's Shaft.	XI	An air blast in the footwall of the shaft.	Wound of right tendo achilles, tendon completely cut and wound of right buttock.
Stuff Cooly ...	Do ...	Do	Do ...	Wound of right knee and dorsum of foot and compound fracture of metatarsals, deep wound of chest, wounds of forehead and scalp.
Cotterman ...	Do ...	Do	Do ...	Left eye completely destroyed, compound fracture of malar bone opening into nose and orbit and wound of right calf.
Stuff Cooly ...	Do ...	Do	Do ...	Deep wound between shoulder blades, multiple bruises.
Do ...	Do ...	Do	Do ...	Wound of right heel and left leg, multiple wounds of back and scalp wound.
Stuff Cooly ...	Stope, 36th level, Glen Shaft.	XIX	While clearing stuff in the stope, a stone slipped and fell on his hand.	Compound fracture of right index finger and wound of middle finger.
Stuff Miner ...	Sink, Carmichael's Shaft.	VIII	While helping to raise an injured cooly upon a sollar, he fell 25 feet, into the sink. Probably the result of exhaustion due to the severe strain of rescue work under trying conditions.	Compound comminuted fracture of frontal bone and deep wound at base of nose. Died in hospital on 3rd September.
Timber Cooly ...	Crosscut, 40th level, Carmichael's Shaft.	XVII	While restoring a derailed bandy to the rails, one of the planks in it dropped on his finger.	Compound comminuted fracture of proximal phalanx of right ring finger.
Hand Jumper Cooly.	Stope, 29th level, Glen Shaft.	XIX	A burst of rock.	Compound fracture of skull, wounds of forehead, back, both knees, legs and left elbow.
Do ...	Do ...	Do	Do ...	Compound fracture of skull and punctured wound of both knees.
Do ...	Do ...	Do	Do ...	Compound fracture of skull and skin wounds of back, wound of right ankle, forehead and left knee.

RECORD OF FATAL AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
7th September...	191	The Champion Reef Gold Mine, Bowringpet Taluk, Kolar District—(contd.)	2	3	...	1 W. Ramaswami...	50
9th September...	193	Do ...	11	3	1 P. Perumal ...	...	50
16th September...	199	Do ...	14	6	...	1 P. Perumal ...	30
17th September...	200	Do ...	7	...	...	1 V. Chinnaswami	25
22nd September...	207	Do ...	19-30	4½	...	1 T. Ponnann ...	50
25th September...	208	Do ...	11	3	1 Gangatharam ...	...	32
						1 Kunthan ...	25
30th September...	212	Do ...	14	6	...	1 Malayappah ...	58
6th October ...	215	Do ...	14	6	...	1 Chinnian ...	26
14th October ...	223	Do ...	11	21	...	1 Karrian ...	21
16th October ...	231	Do ...	7	...	...	1 G. Periathambi...	30
16th October ...	225	Do ...	12	4	...	1 Syed Kassaim ...	38
17th October ...	228	Do ...	21	12	...	1 A. Karrian ...	21
18th October ...	232	Do ...	13	5	...	1 P. Maury ...	28
21st October ...	230	Do ...	10	2	...	1 Abdul Gaffoor ...	23
23rd October ...	237	Do ...	15-30	7	...	1 Muthan ...	25

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—*continued.*

Table 13—*continued.*

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Door Man ...	Crosseut, 41st level, Carmichael's Shaft.	XVII	The stuff bandy ran over his toe probably while asleep by the side of the tram road.	Wound of left foot and compound fracture of little toe.
Black Stone Cooly.	Drive N., 26th level, Carmichael's Shaft.	I	A fall of rock from the hanging wall.	Both legs broken and bowels protruding.
Hand Jumper Cooly.	Stope, 30th level, Garland's Shaft.	XIX	A burst of rock	Compound fracture of pelvis, wounds of back, right thigh, both legs and scalp.
Timber Cooly ...	On the top of Garland's Shaft (Surface)	XXIII	While stocking timber at the shaft head, a piece of plank slipped and fell on his finger.	Compound fracture of right thumb and wound of index finger.
Trammer ...	Sand Dump, Otto Rope way (Surface).	XXII	While mamootying wet sand, from the truck, he lost his balance and rolled down the sand dump.	Simple fracture of both bones of left leg.
Skip Road Cooly.	Skip road, 22nd level, Garland's Shaft.	I	Owing to a fall of rock, a piece of timber was knocked out and fell upon them while securing bad ground.	Fracture of pelvis. Died in hospital on 27th September.
Do ...	Do ...	Do	Do	Ruptured urethra.
Trammer ...	Weigh bridge, quartz yard (Surface).	XXII	While shunting the empty trucks, his leg was broken between the frames of two bandies.	Compound fracture of both bones of left leg.
Timber Mestri (M. 7,379—B. 5,242).	Stope, 29th level, Glen Shaft.	XV	While fixing a prop in the stope, a shale of rock fell on his foot.	Wound over left tendo achilles, tendon completely cut.
Timber Cooly ...	Stope, 25th level, Rowe's Shaft.	XIX	A burst of quartz	Compound fracture of skull.
Hand Jumper Cooly.	Stope, 32nd level, Carmichael's Shaft.	XIX	A burst of quartz	Wound of left heel, tendon partly cut.
Black Stone Cooly.	Drive S., 35th level, Carmichael's Shaft.	XIX	While building a dry wall, a stone fell from it upon his foot.	Compound fracture of right os calcis with tendon completely cut.
Cotterman ...	Sink, below 40th level, Garland's Shaft.	X	While working in the sink, a stone fell from the skip road above and hit him on the hand.	Compound fracture of right middle finger.
Stuff Cooly ...	Drive N., 38th level, Charmichael's Shaft.	XIX	While clearing stuff in the drive, a stone slipped and fell on his foot.	Contusion of right foot.
Black Stone Cooly	Drive S., 28th level, Ribblesdale's Shaft.	XVII	While pulling a bandy, his fingers were caught between the pivot pin and the frame of the bandy.	Compound fracture of left thumb, ring and little fingers.
Timber Cooly ...	Winze, 11st level, Glen Shaft.	XV	While climbing up the ladder, he slipped and fell to the bottom of the winze.	Wound of knee, both lips, right hand and left knee.

RECORD OF FATAL

AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
27th October ...	243	The Champion Reef Gold Mine, Bowringpet Taluk, Kolar District—(contd.)	11-45	3 $\frac{3}{4}$	...	1 A. Duraiswami ...	21
29th October ...	234	Do	9-30	7 $\frac{1}{2}$	1 A. Murugan ...	...	26
1st November ...	239	Do	8-30	1	...	1 Chengalrayan ...	35
8th November ...	245	Do	14	7	...	1 Peria Seethan ...	37
12th November ...	248	Do	20-30	13	...	1 Ahmay Cooty ...	18
18th November ...	256	Do	17	9	...	1 M. Davertharagu	34
20th November ...	257	Do	12	5	...	1 A. Muthuswami	12
4th December ...	264	Do	11-30	4 $\frac{1}{2}$	1 Arumugam ...	...	30
6th December ...	265	Do	16	9	1 Yellan ...	...	60
7th December ...	267	Do	13	5	...	1 Gopal Chetty ...	32
11th December ...	276	Do	9	2	...	1 Beeka ...	12
12th December ...	272	Do	11	4	1 G. Chellan ...	...	30

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—*continued.*

Table 13—*continued.*

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Black Stone Cooly	Drive S., 29th level, Carmichael's Shaft.	I	While clearing stuff, a piece of rock split off from the hanging wall and fell on his foot.	Deep lacerated wound of left ankle.
Skip Filling Cooly	Skip road, 32nd level shoot, Carmichael's Shaft.	VIII	The skip was hoisted while he was standing upon it and he was thrown into the shaft.	Fracture of skull and left leg.
Skip Road Cooly	Plat, 28th level, Garland's Shaft.	XI	While rolling a piece of timber, his finger was caught beneath it.	Compound fracture of proximal phalanx of right index finger.
Mestri (M. 6,261—B. 4,334).	Stope, 28th level, Garland's Shaft.	XIII	By drilling into a socket containing a small quantity of an unexploded charge.	Peppered wounds of left hand, compound fracture of ungual phalanx of ring, middle and index fingers.
Bar Cooly	Drive S., 42nd level, Rowe's Shaft.	XIX	While carrying a chatty of water, he slipped and fell on a pile of stuff.	Compound fracture of left middle and index fingers.
Hand Jumper Cooly.	Stope, 32nd level, Garland's Shaft (Surface)	XIII	By the explosion of a small quantity of an unexploded charge.	Peppered wounds of forehead, penetrating wound of right eye (escape of vitreous) and wound of chest. (Right eye removed.)
Cooly	Tram line, near Garland's Shaft (Surface).	XXII	While riding on the frame of a coal truck, it collided with another truck and broke his head.	Compound depressed fracture of skull.
Fitter Cooly	Mill (Surface).	XX	While attempting to cross between the driving belt and pulley, it is presumed he slipped and was caught by the machinery.	Decapitation.
Watchman	Charging platform, No. 1, Cyanide Works (Surface).	XXIII	He fell from a platform to the ground fifteen feet below.	Wound of scalp (bone exposed) wound of face and right 4th toe. Died in hospital on 7th December.
Hand Jumper Cooly.	Stope, 33rd level, Garland's Shaft.	XIX	While drilling in the stope, the handle of the hammer broke and the hammer head fell on his finger.	Compound fracture of left ring finger
Tram Boy	Otto Ropeway (Surface).	XXII	The flange of a point bracket broke and fell on his head as he was passing underneath it.	Compound fracture of skull.
Hand Jumper Cooly.	Stope below 28th level N. of No. 3 winze N., Garland's Shaft.	XIII	Drilled into a socket containing portion of an unexploded charge.	Face, left hand, and leg smashed.

RECORD OF FATAL AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
16th December ... (contd.)		The Champion Reef Gold Mine, Bowringpet Taluk, Kolar District—(concl'd.)	...	...	...	1 V. Muniswami ...	22
16th December ...	277	Do ...	10	3	...	1 M. Chengalrayan	14
23rd December ...	281	Do ...	4-30	4½	...	1 Kauly ...	40
26th December ...	285	Do ..	14-30	4	...	1 Veeraswami ...	26
27th December ...	284	Do ...	14-30	7½	...	1 P. Abboo ...	30
28th December ...	286	Do ...	11	3	...	1 Perumal ...	30
3rd January ...	1	The Ooregum Gold Mine, Bowringpet Taluk, Kolar District.	16	1	...	1 U. Syed Ali ...	25
4th January ...	2	Do ...	20	5	...	1 A. Kuppan ...	35
13th January ...	6	Do ...	16-5	1	...	4 V. Munian ...	30
						T. Manickam ...	28
						T. Muniswami ...	31
						J. Arokiaswami	40

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—continued.

Table 13—continued.

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Hand Jumper Cooly.	Stope below 28th level N. of No. 3 winze, N., Garland's Shaft.	XIII	Drilled into a socket containing portion of an unexploded charge.	Compound depressed fracture of skull, wounds of nose, foreign bodies in both eyes and peppered wounds of face chest, and both legs.
Apprentice (Tin Smith).	No. 1 Mill yard (Surface).	XXIII	While chipping some zinc, a small piece struck him in the eye.	Penetrating wound of right eye; escape of vitreous.
Pipe Cooly ...	Drive, 46th level, Carmichael's Shaft.	XIX	A burst of quartz ...	Compound fracture of right fourth metatarsal.
Skip Road Cooly	Skip road below the 3rd level, Garland's Shaft.	XI	While removing old packing from behind the shaft timbers, a piece of timber rolled over and jammed his hand against the rail of the skip road.	Compound fracture of left 3rd metacarpal and wound of left hand, index and middle fingers.
Bandy Fitter ...	Discharge tram line, No. 1 Cyanide Works (Surface).	XXII	While attempting to stop a bandy in motion, it collided with another at rest and his leg was broken by the impact.	Simple multiple fracture of right patella.
Hand Jumper Cooly.	Stope, 36th level N., Garland's Shaft.	XIX	A burst of quartz ...	Compound fracture of right big toe, wounds of second toe and heel, left leg and big toe.
Hand Jumber Cooly.	No. 1 Bottom stope, 3,710 foot level N. from winze, Bullen's Shaft.	XIX	A burst of rock ...	Compound fracture of skull.
Handleman ...	Bottom of Taylor's Shaft.	X	An end piece which was being put into position fell upon him in the sink from a height of about 10 feet.	Fracture of left lower ribs.
Handleman ...	Near the bottom of Bullen's Incline Shaft.	XI	An air blast or burst of rock ...	Compound fracture of skull.
Cotterman ...	Do ...	Do	Do ...	Compound fracture of frontal bone, wound of scalp, right foot and left tendo-achilles, tendon not cut.
Do ...	Do ...	Do	Do ...	Compound fracture of cervical spine, wound below right knee, left wrist and leg.
Do ...	Do ...	Do	Do ...	Compound fracture of skull, wound of right leg.

RECORD OF FATAL AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
15th January ...	7	The Ooregum Gold Mine, Bowringpet Taluk, Kolar District—(contd.)	0-15	9	1 P. Narayana Nair.	...	28
16th January ...	14	Do ...	9	2	...	1 V. Perumal ...	30
19th January ...	11	Do ...	14-30	7½	...	1 T. Krishnan ...	13
26th January ...	20	Do ...	14	7	...	1 K. Ramaswami.	35
2nd February ...	25	Do ...	16	1	...	1 P. Ravoonie Nair	25
14th February ...	31	Do ...	9	2	...	1 P. Iyacunnoo ...	35
18th February ...	35	Do ...	10-30	3½	...	1 C. Abboo ...	35
23rd February ...	40	Do ...	12	5	...	1 O. Krishna Nair	25
9th March ...	47	Do ...	14-30	7½	...	1 P. Raman Nair...	25
14th March ...	49	Do ...	10	3	...	1 Padavattan ...	35
19th March ...	54	Do ...	11-30	4½	...	1 V. Chinnian ...	25
22nd March ...	59	Do ...	2	3	...	1 K. Ahmed Kutty	30
4th April ...	62	Do ...	14	7	...	1 A. Koonjalam ...	40

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—*continued.*

Table 13—*continued.*

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Mestri (M. 3,746—B. 3,012).	No. 2 winze, 4,410 foot level N. from crosscut East, Oakley's Shaft.	XIII	Through boring into an old hole containing some blasting gelatine.	Injuries to head and body.
Timber Mestri (M. 6,707—B. 4,689).	No. 13 bottom stope, 3,310 foot level N., Taylor's Shaft.	XIX	While breaking big pieces of rock, a small stone flew into his eye.	Wound of left cornea and traumatic cataract.
Mason Cooly ...	Near butcher's stall (Surface).	XXIII	While carting building stones, the cart capsized and a few stones fell on his thigh.	Simple fracture of right femur.
Hand Jumper Cooly.	No. 1 bottom stope, 2,310 foot level S. from crosscut East, No. 2 branch, Bullen's Shaft.	XIII	Presumably drilled into a socket containing a small quantity of an unexploded charge.	Compound fracture of fifth metacarpal. Foreign bodies in both eyes; multiple wounds of face, both thighs and legs.
Bar Cooly ...	End, 46th level N. from crosscut East, Oakley's Shaft.	XIX	While working in the end, a shale of rock due to a burst, fell on his foot.	Compound fracture of right great toe.
Timber Cooly ...	No. 12 back stope, 460 foot level S. from crosscut, No. 3 East Reef, Wallroth's Shaft.	XIX	While handing up stones one of them slipped and fell on his foot.	Compound fracture of right great toe.
Oiler ...	Small skip road, about 50 feet below the 28th level, Oakley's Shaft.	XI	While oiling the rollers, the descending gig caught his thigh against the dividing.	Simple fracture of left femur.
Cotterman ...	Winze, 4,810 foot level, Oakley's Shaft.	XIII	By boring into a socket containing a small quantity of an unexploded charge.	Wound of left eye, forehead, lower lip and compound fracture of frontal bone.
Cotterman ...	48th level N., Oakley's Shaft.	XIX	While fixing the stretcher bar, a shale of quartz, due to a burst, fell on his finger.	Compound fracture of left index finger.
Discharging Cooly	Tailings Dump (Surface).	XXII	While tramming sands, he pulled the bandy and it ran over his toes.	Compound fracture of big and second toes.
Stuff Cooly ...	Plat, 1,510 foot level, Oakley's Incline Shaft.	XI	A burst of rock ...	Complete division of left tendo achilles and laceration of left ankle.
Blaster, (M. 3,048—B. 4,091).	No. 10a back stope, 280 foot level N. from crosscut, No. 2 East Reef, Wallroth's Shaft.	III	A fall of loose rock after blasting ...	Compound fracture of right 5th metatarsal and left second toe; joint opened.
Hand Jumper Cooly (M. 1,506).	No. 8 bottom stope, 14th level N. from crosscut, No. 3 East Reef, Wallroth's Shaft.	XIX	While working in the stope, shales of rock, due to a burst, fell on him.	Compound fracture of skull, wounds of right foot and back.

RECORD OF FATAL AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
7th April ...	66	The Ooregum Gold Mine, Bowringpet Taluk, Kolar District—(contd.)	4-30	5½	...	1 P. Chinna Abboo	40
17th April ...	72	Do ...	10	3	...	1 A. Arasan ...	40
17th April ...	78	Do ...	12	5	...	1 K. Nanoo Tharagan,	25
18th April ...	71	Do ...	6	7	...	1 M. Hoosain ...	20
21st April ...	76	Do ...	22-30	7½	...	1 K. Krishna Kooroopoo,	35
6th May ...	82	Do ...	13	6	...	1 P. Madhavan Nair	26
6th May ...	83	Do ...	17-30	8½	...	1 P. Murugasa Mudaliar,	35
16th May ...	93	Do ...	13-30	6½	...	1 M. Naigam ...	25
17th May ...	94	Do ...	14	7	...	1 M. Mahomed ...	25
31st May ...	106	Do ...	13	6	...	1 K. Chinnappan...	35
11th June ...	111	Do ...	11-30	4½	1 P. Muniswami ...	...	35

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—*continued.*

Table 13—*continued.*

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Handleman ...	Sink, below 4,410 foot level, Bullen's Incline Shaft.	XI	While clearing stuff in the sink, a sharp shale of rock slipped from the foot wall and cut his foot.	Complete division of right tendo achilles.
Timber Mestri (M. 6,693).	No. 5 bottom stope, 34th level S. from crosscut East, Bullen's Shaft.	XIX	A small stone cut in the hitch close by flew and struck him in the eye.	Right cornea torn.
Hand Jumper Cooly.	No. 1 back stope, 36th level S. from crosscut East, No. 2 branch, Bullen's Shaft.	XIX	A burst of quartz	Punctured wound of left knee.
Blast Cooly ...	44th level S., from winze, Taylor's Shaft.	XIX	While clearing stuff in the end, a shale of rock from the roof, due to a burst, fell on his head.	Compound fracture of skull.
Machine Mestri (M. 1,539).	No. 1 crosscut west, 44th level, Bullen's Shaft.	XIX	While resting in the crosscut, a slab of rock split off from the roof and dropped on his legs.	Compound fracture of both bones of left leg, and lacerated wound of right thigh. Wounds of right elbow, right knee and foot. (Left leg amputated.)
Machine Cooly ...	No. 1 rise, 43rd level N. from No. 2 winze, (42nd level S.), Bullen's Shaft.	XIX	While fixing the bar in the rise, a shale of quartz due to a burst, fell on his foot.	Compound fracture of left metatarsals.
Bricklayer ...	New compressor house in course of construction, near Bullen's Shaft (Surface).	XXIII	While removing a plank from the scaffolding, he made a false step and fell to the ground from a height of about 19 feet.	Wound of scalp, fracture of base of skull and traumatic emphysema of left side of chest.
Hand Jumper Cooly.	No. 13 bottom stope, 30th level N., Taylor's Shaft.	XIX	While working in the stope, a shale of rock from the hanging wall, due to an air blast, fell on his back.	Injury to back.
Hand Jumper Cooly.	No. 9 back stope, 15th level N. from crosscut, No. 3 East Reef, Wallroth's Shaft.	XIX	A burst of quartz	Wound into right knee joint.
Handleman ...	Plat, 50th level, Taylor's Shaft.	XI	While clearing stuff, a small splinter of rock from the hanging, due to a burst, hit him in the eye.	Left cornea and iris prolapsed.
Timber Cooly ...	Plat at the 46th level, Bullen's Shaft.	XI	While working behind the skip road, the ascending skip overturned and jammed his leg against the shaft timbers.	Compound fracture of both bones of right leg and laceration of foot. Died of tetanus in hospital on 21st June.

RECORD OF FATAL AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
12th June ...	113	The Ooregum Gold Mine, Bowringpet Taluk, Kolar District—(contd.)	15-30	8½	1 O. Velu ...	...	25
29th June ...	131	Do ...	22	2	1 L. Gopal Numbiar	...	30
7th July ...	135	Do ...	2-30	8	1 M. Rayoo ...	...	25
8th July ...	143	Do ...	11	4	...	1 U. Ammoo ...	30
18th July ...	138	Do ...	12-45	5	...	1 W. U. Ahmed ...	22
23rd July ...	145	Do ...	15	8	...	1 M. Koonji Ahmed	20
8th August ...	161	Do ...	10-30	4	...	1 C. Govindan ...	18
9th August ...	162	Do ...	12-40	5	...	1 U. Syed Ali ...	20
20th August ...	183	Do ...	12	5	...	1 U. Kutty Athan	24
20th August ...	171	Do ...	12-30	5	...	1 K. Perumal ...	30
20th August ...	172	Do ...	14-10	7	...	1 U. Ahmed ...	26
23rd August ...	180	Do ...	18-5	3½	...	1 Cauvery ...	24

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—continued.

Table 13—continued.

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Hand Jumper Cooly.	No. 1 bottom stope, 36th level S. from No. 1 crosscut E., Taylor's Shaft.	XV	While climbing the ladder he slipped and fell into the stope from partway down.	Internal injuries to head.
Assistant Blaster	Main winze, Taylor's Shaft.	XV	He fell into the winze ...	Head smashed, etc.
Hand Jumper Cooly.	3,510 foot level, Oakley's Shaft.	VIII	When climbing down the shaft, he slipped from the ladder and fell for 50 feet.	Fracture of base of skull, right arm broken, etc.
Hand Jumper Cooly.	No. 1 back stope, 3,510 foot level, Bullen's Shaft.	XIX	A small burst of rock ...	Wound of left knee, three days old.
Hand Jumper Cooly.	No. 1 back stope, 3,510 foot level, Bullen's Shaft.	XIX	A burst of rock ...	Compound fracture of skull.
Hand Jumper Cooly.	No. 7 bottom stope, 3,410 foot level S. from crosscut East, Bullen's Shaft.	I	A piece of loose rock fell from the hanging wall upon his head.	Compound fracture of skull.
Stuff Cooly ...	Drive, 3,610 foot level, Bullen's Shaft.	XVII	While tramming stuff, the bandy derailed and caught his fingers against the pinion rest.	Lacerated wound and compound fracture of right ring finger, wound of little finger, nail off and wounds of left ring and little fingers.
Hand Jumper Cooly.	No. 9 bottom stope, 3,310 foot level N., Taylor's Shaft.	XIX	A burst of rock ...	Lacerated wound of left leg, bone exposed.
Hand Jumper Cooly.	No. 7 bottom stope, 3,610 foot level S., Bullen's Shaft.	XIX	An air blast ...	Wounds of left foot, ankle, leg, knee and right foot.
Stuff Mestri (M. 6,674).	Drive, 33rd level, Oakley's Incline Shaft.	XIX	An air blast ...	Lacerated wound of right hand. Compound fracture of proximal phalanx and disarticulation of the metacarpal phalangeal joint of the middle finger and scalp wound.
Hand Jumper Cooly.	No. 6 bottom stope, 3,610 foot level, Bullen's Shaft.	XIX	An air blast ...	Wound of left foot, extensor tendons exposed and wound of scalp.
Stuff Cooly ...	Drive, 3,610 foot level N., Bullen's Shaft.	XIX	While pushing a bandy in the level, a shale of rock from the roof, due to a burst, fell on his hand.	Compound fracture of left little finger.

RECORD OF FATAL

AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
4th September...	189	The Ooregum Gold Mine, Bowringpet Taluk, Kolar District—(contd.)	14	7	...	1 M. Onee ...	25
9th September...	194	Do ...	12	5	...	1 M. Mamoo ...	28
12th September...	195	Do ...	11	4	...	1 V. Raman ...	25
15th September...	198	Do ...	13	6	...	1 M. Avaran ...	22
18th September...	203	Do ...	11	4	...	1 V. Perumal ...	32
20th September...	205	Do ...	13	6	1 V. Munian ...	...	35
						1 O. Buddan ...	28
20th September...	206	Do ...	20-30	5½	...	1 D. Perumal ...	32
27th September...	210	Do ...	23	...	1 V. Munian ...	...	27
1st October ...	213	Do ...	11-45	5	...	1 P. Raman Nair...	32
11th October ...	220	Do ...	3-30	4½	1 P. Madava Nair	...	23

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—*continued.*

Table 13—*continued.*

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Hand Jumper Cooly.	No. 16 bottom stope, 3,310 foot level, Taylor's Shaft.	XIX	While drilling in the stope, a shale of rock, due to a burst, fell on his knee.	Wound of left knee, opening into the joint and compound fracture of head of tibia.
Hand Jumper Cooly.	No. 1a back stope, 15th level N., Taylor's Shaft.	XIX	A burst of quartz	Wound of right foot, extensor tendon cut.
Timber Cooly ...	No. 1 back stope, 3,710 foot level, Oakley's Shaft.	XIX	While shaping a wedge with an axe, he accidentally cut his own finger.	Compound fracture of left index finger.
Hand Jumper Cooly.	No. 1 bottom stope, 3,410 foot level N., Bullen's Shaft.	XIX	While working in the stope, a shale of rock from the hanging wall, due to a burst, fell on his head.	Compound fracture of skull.
Timber Cooly ...	No. 2 a back stope, 1,410 foot level, No. 2 East Reef, Wall-roth's Shaft.	XV	While fixing a piece of timber, he fell off the stage and broke his leg.	Simple fracture of left femur, skin wound of left forearm and right leg.
Mestri (M. 1,334)	No. 14 bottom stope, 3,310 foot level S., Oakley's Shaft.	XIII	Through boring into a socket containing some blasting gelatine.	Compound comminuted fracture of left leg (amputated). Compound fracture of lower jaw, wound of lower lip, scalp and right leg. Died in hospital on 25th September.
Hand Jumper Cooly.	Do ...	Do	Do ...	Penetrating wound of right eye, wound of cornea of left eye, scalp wound, lacerated wound of right hand, with compound and comminuted fracture of left hand and wound of right thigh.
Machine Mestri (M. 5,714).	Sink, below the 5,010 foot level, Taylor's Shaft.	X	Struck by a stone which fell from part-way down the shaft.	Compound fracture of left humerus and wound of left forearm.
Hand Jumper Cooly.	No. 15 bottom stope, 3,310 foot level, Oakley's Shaft.	XV	He fell into a stope	Injuries to head and body.
Mestri (M. 1,903 —B. 3,120).	No. 1 winze, 40th level N., Drive N. on branch, Bullen's Shaft.	XIII	Through boring into a socket containing some blasting gelatine.	Penetrating wounds of both eyes, pepper wounds of forehead, face, forearm, chest and right leg.
Blaster (M. 7,670 —B. 5,478).	Winze, 42nd level S., Bullen's Shaft.	XV	Fell while helping to put a small skip on the rails.	Injuries to head and right foot.

RECORD OF FATAL AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
12th October ...	221	The Ooregum Gold Mine, Bowringpet Taluk, Kolar District —(contd.)	10-30	3½	...	1 G. Govindan ..	25
13th October ...	222	Do ...	12	5	...	1 V. Kanniappan...	27
29th October ...	235	Do ...	11-55	4½	...	1 M. Chinnian ...	27
30th October ...	238	Do ...	14-30	7	4 U. K. Parathi ...	...	25
					M. K. Beeran Kutty H. Kunhiamoo... and P. Alavi ...	...	24 20 30
2nd November...	240	Do ...	9-30	2½	...	1 K. Duraiswami.	13
9th November...	249	Do ...	10-15	7	...	1 S. Maury ...	23
13th November...	259	Do ...	14	7	...	1 C. Ramaswamy.	30
14th November...	250	Do ...	5	8½	...	1 V. Kuppuswami.	30
16th November...	251	Do ...	13	6	1 J. Ponnuswami...	...	35
17th November...	252	Do ...	11-30	4½	...	1 Arjunan ...	14
19th November...	254	Do ...	3-30	4½	1 P. Govindan Nair	...	26

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—*continued.*

Table 13—*continued.*

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Timber Cooly ...	Main winze below 42nd level, Taylor's Shaft.	XI	A plank was dislodged by the skip from the stage on which it rests above the sink and fell upon him.	Wounds of scalp and simple fracture of left radius.
Hand Jumper Cooly.	No. 7 bottom stope, 3,710 foot level S. from winze, Bullen's Shaft.	XIX	A burst of rock ...	Compound fracture of both bones of right leg, wound of left ankle, right elbow and knee.
Hand Jumper Cooly.	No. 2 bottom stope, 3,710 foot level S., Bullen's Shaft.	XIX	A burst of rock ...	Compound fracture of skull.
Hand Jumper Cooly.	Bottom stope Nos. 5 and 6, 3,410 foot level N., Taylor's Shaft.	XIX	An air blast ...	Crushed to death.
Do	Do ...	Do	Do ...	Do
Do	Do ...	Do	Do ...	Do
Do	Do ...	Do	Do ...	Do
Cooly ...	Near Oakley's picking floor (Surface).	XXII	While tramming stuff, his finger was jammed between the rims of two adjacent bandies.	Compound fracture of right little finger.
Stuff Cooly ...	3,210 foot level, Oakley's Incline Shaft.	VIII	While climbing down to remove the gate piece, he slipped and fell on it.	Contusion of back.
Stuff Cooly ...	No. 14 bottom stope, 31st level N. from winze, Oakley's Shaft.	XIX	While filling a bandy from the shoot, a stone dropped on his foot.	Compound fracture of left second toe, wound of foot.
Machine Cooly ...	In the cage at Bullen's Shaft.	VI	While riding up in the cage, a piece of casing plank struck him on the thigh.	Compound fracture of left second toe, deep wound of left thigh, muscle cut and traumatic synovitis of knee.
Pipe Fitter ...	Plat, 2,110 foot level, Oakley's Shaft.	XI	While dismounting the drum of an air hoist, it slipped and jammed his foot against the ground.	Compound fracture of left second and third toes. Died of tetanus in hospital on 28th November.
Clean Boy ...	Cage engines, Oakley's Shaft (Surface).	XX	While the engine was in motion, his finger was jammed between the geared wheels of the indicator.	Lacerated wound ¹ of left hand, index finger off.
Blaster's Assistant	Sink, below the 50th level, main winze, Taylor's Shaft.	VIII	He fell down the shaft ...	Compound fracture of skull, etc.

RECORD OF FATAL AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
8th December ...	268	The Ooregum Gold Mine, Bowringpet Taluk, Kolar District —(concl'd.)	13-30	7½	...	1 Muniswami ...	12
9th December ...	269	Do ...	12	5	...	1 M. Karuppan ...	27
12th December ...	273	Do ...	16-30	8½	...	1 Govindaswami ...	25
24th December ...	282	Do ...	9-20	10½	...	1 U. Moideen Hajee	40
12th January ...	5	The Nundydroog Gold Mine, Bowringpet Taluk, Kolar District	10-30	3½	...	1 O. Sukuran ...	39
22nd January ...	15	Do ...	13-30	6½	...	1 S. Munian ...	38
24th January ...	16	Do ...	8	1	...	1 Syed Ally ...	22
29th January ...	21	Do ...	11-45	4¾	...	1 Chinna Anthony	43
2nd February ...	24	Do ...	14	7	...	1 Perumal Gowndan	16
7th February ...	27	Do ...	10	3	...	1 R. Muniswami ...	20
18th February ...	37	Do ...	12	5	...	1 Ramachandran...	16
23rd February ...	39	Do ...	10-30	3½	...	1 V. Perumal ...	36
28th February ...	43	Do ...	17-30	2½	...	1 Govinda Nair ...	32

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—continued.

Table 13—continued.

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Brake Boy ...	Tailings Dump, Extension Plant, Cyanide Works (Surface).	XXII	While removing the brake block put against the wheel of a bandy, the bandy slipped back and ran over his hand.	Lacerated wound of right hand; (amputation of hand.)
Timber Mestri ... (M. 7,918—B. 5,679).	No. 14 back stope, 4th level, Main Shaft.	XIX	While driving a nail into a plank, it rebounded and struck him in the eye.	Penetrating wound of left eye, escape of vitreous.
Planing Machine Attendant.	Carpenter's shop, (Surface).	XX	While planing a piece of plank, his fingers came in contact with the revolving blades of the planing machine.	Compound fractures of right and left index, middle and ring fingers.
Blaster (B. 2) ...	Sub-Magazine, Detonator room, Bullen's Shaft (Surface).	XXIII	The explosion of a detonator ...	Lacerated wound of left hand; amputated.
Hand Jumper Cooly.	Bottom stope, 230 foot level N., Kennedy's Shaft.	XIII	Through boring into an old hole which contained some blasting gelatine.	Simple fracture of right radius, compound fracture of inner 4th metacarpal and multiple wounds of left hand and scalp.
Hand Jumper Cooly.	North back stope, No. 2 fold, 1,900 foot level, Richards' Shaft.	XIII	Through boring into an old hole containing a small amount of blasting gelatine.	Foreign bodies in both eyes, compound fracture of left little finger and wound of left hand, forearm, left knee and right leg.
Jumper Cooly ...	Tram line, Blacksmith's shop (Surface).	XXII	While tramming jumpers to the smithy, one of them fell on his hand.	Compound fracture of left little finger.
Timber Mestri ... (M. 622—B. 4,219).	Drive, 900 foot level, Kennedy's Shaft.	XIX	While propping up loose ground, a small stone fell on his foot.	Compound fracture of 2nd toe and wound of right great toe.
Stuff Cooly ...	Drive, 2,600 foot level, Kennedy's Shaft.	XVII	While tramming stuff, his fingers were jammed between the bandy and the side of the drive.	Compound fracture of left little finger and wound of ring finger.
Timber Cooly ...	Drive, 2,000 foot level, Kennedy's Shaft.	XIX	While rolling a piece of stone, his fingers were caught beneath it.	Compound fracture of left middle finger and wound of ring finger.
Apprentice Carpenter.	Carpenter's shop (Surface).	XXIII	While putting back a chisel into a box, he cut his finger against the lid.	Compound fracture of right index finger.
Mestri (M. 5,995—B. 4,020).	Plat, 3,050 foot level, Richard's Shaft.	XI	A burst of rock ...	Simple fracture of right fibula and wounds of scalp and right upper eyelid.
Mestri (M. 6,851—B. 4,802).	South winze, 2,900 foot level, Kennedy's Shaft.	XIX	A burst of rock ...	Compound fracture of vault of skull.

RECORD OF FATAL AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
2nd March ...	45	The Nundydroog Gold Mine, Bowringpet Taluk, Kolar District—(contd.)	12-45	5 $\frac{3}{4}$	1 Palyam ...	...	28
31st March ...	60	Do ...	13-30	6 $\frac{1}{2}$	...	1 V. Kuppan ...	25
4th April ...	65	Do ...	7-45	8 $\frac{3}{4}$	1 K. Narayanan .	...	25
7th April ...	68	Do ...	14	7	...	1 A. Munian ...	30
4th May ...	85	Do ...	13	6	...	1 S. Karupannan...	28
15th May ...	89	Do ...	13	6	...	1 Mauren ...	20
15th May ...	90	Do ...	14	7	...	1 K. Rungan ...	45
27th May ...	101	Do ...	10	4	...	1 V. Govindan ...	41
1st June ...	107	Do ...	14-30	7 $\frac{1}{2}$	...	1 S. Muniswami ...	28
3rd June ...	108	Do ...	11-30	4 $\frac{1}{2}$	...	1 A. Muniswami ...	23
12th June ...	114	Do ...	10-30	3 $\frac{1}{2}$	...	1 A. Perumal ...	20
26th June ...	128	Do ...	7-30	$\frac{1}{2}$	...	1 Chamoo Nair ...	30

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—*continued.*

Table 13—*continued.*

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Timber Cooly ...	900 foot level, Kennedy's Shaft.	VIII	He slipped and fell for 300 feet when working in the shaft.	Severe injuries to head and body.
Mestri (M. 7,416 —B. 5,266).	Winze, 3,050 foot level S., Kennedy's Shaft.	I	While taking down loose, a piece of rock fell on his hand.	Compound fracture of left thumb and index finger; (amputated).
Jumper Cooly ...	3,050 foot plat, Kennedy's Shaft.	VI	When riding up on the bar of a skip, his head struck against a plank and he fell down the shaft.	Killed instantaneously.
Hand Jumper Cooly.	No. 1 bottom stope, 1700 foot level N., Kennedy's Shaft.	XIX	A burst of quartz ...	Compound fracture of skull, multiple wounds of face, chest, abdomen and penis, and left eye destroyed.
Bar Cooly ...	Drive N., 2,900 foot level, Oriental Shaft.	XIX	A burst of quartz ...	Wound of left knee.
Timber Cooly ...	Plat, 2,450 foot level, North Shaft.	XIX	A heavy air blast ...	Deep wound lacerating right calf muscles and haemorrhage.
Mestri (M. 101).	Drive, 2,300 foot level, Richards' Shaft.	XIX	While breaking rocks, a small stone flew and struck him in the eye.	Cornea torn across.
Stuff Cooly ...	Winze, 2,900 foot level S., Richards' Shaft.	XIX	An air blast ...	Compound fracture of skull.
Timber Cooly ...	Skip road, above 170 foot level, North Shaft.	XI	While tightening the nut of a roller in the skip road, a wheel of the descending skip ran over his fingers.	Compound fracture of left ring finger and wound of middle finger.
Pipe Fitter ...	Ladder road above 2,000 foot level, Kennedy's Shaft.	VIII	While climbing up by ladder, he lost his hold and fell down the ladder road.	Compound fracture of right metatarsal, second, third and fourth toes and loss of tooth.
Timber Cooly ...	Plat 2,300 foot level, Taylor's Shaft.	XI	While shifting a wall plate in the plat, his fingers were caught beneath it.	Compound fracture of right middle finger and wound of index and ring fingers.
Mestri (M. 2,426).	No. 2 winze, 2,900 foot level S., Kennedy's Shaft.	XV	While climbing down by ladder in the winze, he slipped and fell down through a distance of about 10 feet.	Compound fracture of skull and simple fracture of right femur and wound of chin.

RECORD OF FATAL AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
21st July ...	142	The Nundydroog Gold Mine, Bowringpet Taluk, Kolar District —(contd.)	21	6	1 C. Perumal ...	...	45
26th July ...	149	Do ...	14-10	5½	...	1 V. Murugase ...	35
29th July ...	152	Do ...	8	1	...	1 J. C. D'Sylva ...	38
29th July ...	150	Do ...	12-30	5½	...	1 G. Krishtan ...	30
5th August ...	156	Do ...	6-30	7½	1 K. Valoyudam ...	...	45
7th August ...	157	Do ...	17-15	2½	...	1 A. Rangaswami...	30
8th August ...	160	Do ...	3-30	4½	...	1 V. Kuppan ...	38
10th August ...	163	Do ...	14-15	7½	...	1 Gangadaram ...	20
14th August ...	166	Do ...	13-30	6½	...	1 B. Narayana-swami.	30
3rd September...	187	Do ...	10	3	1 E. Ramannan ...	...	30
						1 E. Mosuwannan alias Musa Gowndan.	25
3rd September...	188	Do ...	19	4	...	1 B. Arokiaswami	25

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—continued.

Table 13—continued.

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Stuff Cooly ...	Drive, 3,050 foot level, Kennedy's Shaft.	I	A fall of rock from the hanging wall of the drive.	Simple fracture of left femur, wound of back, injury to chest and distension of abdomen and internal haemorrhage. Shock. Died in hospital on 22nd July.
Timber Cooly ...	Back Stope, 2,750 foot level S., Kennedy's Shaft.	XV	A small stone fell from a stage upon his head.	Compound fracture of frontal bone.
Ag. Stuff Miner	Plat 2,000 foot level, Kennedy's Shaft.	XI	While filling chatties at the foot of a pile of stuff, a stone from its top rolled on his finger.	Forefinger of left hand crushed.
Stuff Cooly ...	Sink, 50 feet below 3,200 foot level, Kennedy's Shaft.	X	Struck by a stone which fell down the shaft.	Compound fracture of right humerus.
Blaster (B. 710).	Crosscut East, 3,200 foot level, Kennedy's Shaft.	XIV	While attempting to blast 13 holes in one round, the first charge exploded before he had finished igniting the fuses.	Severe injuries to head and body.
Stuff Cooly ...	Skip road 50 feet below 3,200 foot level, Kennedy's Shaft.	X	While clearing stuff in the shaft, a piece of stone from the excavation above fell on his shoulder.	Wound penetrating right shoulder breaking sterno clavicular joint.
Timber Cooly ...	Tipping place, 2,000 foot level, Richards' Shaft.	XVII	While tramming stuff in the drive, his hand was caught between the bandy and the air main pipe.	Lacerated wound of right middle finger and compound fracture of proximal phalanx.
Tea Boy ...	In black rock skip, Kennedy's Shaft.	VI	When riding up the shaft in a skip, the door opened and his leg was broken by being caught between it and the side of the skip.	Compound multiple fracture of both bones of left leg and wound of right leg.
Timber Cooly ...	Drive S., 3,050 foot level, Kennedy's Shaft.	XIX	A burst of rock ...	Compound fracture of left little finger, wounds of left knee, back, foot, shoulder, and right eye brow and tooth knocked out.
Cotterman ...	Crosscut East, 2,750 foot level S., Kennedy's Shaft.	XIX	A burst of rock ...	Crushed to death.
Bar Cooly ...	Do ...	Do	Do ...	Deep wound of back penetrating left pleura, penetrating wound of left knee.
Cotterman ...	Sink, below 2,900 foot level, Richards' Shaft	XI	A burst of rock ...	Compound fracture of skull and wound of left wrist.

RECORD OF FATAL AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
12th September...	201	The Nundydroog Gold Mine, Bowringpet Taluk, Kolar District — (contd.)	12	6	...	1 B. Moorthan ...	25
29th September...	211	Do	10	3	...	1 Patchamolga alias Perumal.	35
8th October ...	217	Do	6-15	7½	...	1 K. Thandrayan...	50
8th October ...	218	Do	17-30	...	1 Perumal ...	...	52
9th October ...	219	Do	11	4	1 John Burrows ...	...	33
16th October ...	224	Do	5	6	...	1 G. Maury ...	25
30th October ...	236	Do	1	2	...	1 V. Kuppan ...	40
5th November...	242	Do	14-15	7½	...	1 K. Murugan ...	22
8th November...	244	Do	10	3	1 V. Muniswami ...	...	20
22nd November...	260	Do	10	3	...	1 Ammoyee (Female)	16

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—continued.

Table 13—continued.

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Timber Cooly ...	Drive, 1,900 foot level, Richard's Shaft.	XIX	While footing a stull piece in the hitch, it slipped and fell on his foot.	Lacerated wound of left foot and heel and wound of left knee.
Cooly ...	No. 1 Distribution Vat (Cyanide works).	XXIII	While emptying a vat, a heavy lump of sand fell on his leg.	Wound below left knee, simple and comminuted fracture of both bones of left leg.
Shoot Cooly ...	Top of Kennedy's Shaft.	XX	His arm was struck by the handle of the winch at which he was working.	Simple fracture of right humerus.
Watchman ...	Mill Engine house, (Surface).	XX	He was struck by a pulley on the main shaft of the mill.	Compound fracture of skull, penetrating wound of right side of chest. Wounds of back and thigh. Died in hospital on 9th October.
Pit and Timberman.	700 foot level, Walker's Shaft.	VIII	Owing to the breaking of a plank he fell 50 feet down the Shaft.	Concussion of brain, lacerated scalp wound. Probably compression also. Died in hospital the same day.
Timber Cooly ...	Do ...	Do	Do ...	Compound fracture of left malar bone, lacerated scalp wound.
Handleman ...	Sink, below 3,050 foot level, Kennedy's Shaft.	XI	A burst of rock ...	Compound fracture of skull.
Handleman ...	Sink, below 3,050 foot level, Richard's Incline Shaft.	VI	When riding up the shaft on a stuff skip, his back struck against the plat timbers.	Simple fracture spinal column.
Timber Cooly ...	Plat, 2,000 foot level, Richard's Incline Shaft.	XI	While removing sample bags from the cage, it was suddenly lowered and the bow of the cage struck him on the head.	Compound fracture of frontal bone and wounds of scalp and shoulder.
Skip Road Cooly...	Ladder road, about 50 feet below 1,300 foot level, Kennedy's Shaft.	X	He was struck by a falling plank and fell forty feet down the shaft.	Compound fracture of skull, simple fracture of left femur, and wounds of forehead and face. Died in hospital on the 10th November.
Bricklayers' Cooly	New Slimes Plant ...	XXIII	Fell from a wall into an excavation 20 feet deep.	Compound fracture of skull, wounds of face and lip and compound fracture of left great toe.

RECORD OF FATAL

AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
29th November ...	261	The Nundydroog Gold Mine, Bowringpet Taluk, Kolar District —(concl'd.)	3-20	5	1 Paren ...	...	28
				5	...	2 P. Chadayan ...	21
				4½	...	and M. Valoo ...	32
22nd December ...	280	Do ...	12	5	...	1 B. Sangam ...	50
11th January ...	8	The Balaghat Gold Mine, Bowringpet Taluk, Kolar District.	11	4	...	1 Ramaswami ...	40
19th February ...	38	Do ...	20	5	...	1 Gungan ...	20
14th March ...	50	Do ...	9-30	2½	...	1 Munian ...	55
17th May ...	91	Do ...	14	7	...	1 Gopalan ...	21
22nd June ...	123	Do ...	10	3	1 Gungiah ...	...	32
19th July ...	141	Do ...	8-50	1½	...	1 Bastian ...	38
24th July ...	146	Do ...	9-30	2½	...	1 Muniruthnam ...	20
9th September ...	192	Do ...	6-15	7½	1 Lingappa ...	...	40
13th September ...	196	Do ...	14-30	7½	...	1 Alabi ...	30
20th October ...	229	Do ...	11-15	4½	...	1 Parasuraman ...	24

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—continued.

Table 13—continued.

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Handleman ...	Sink, below 2,900 foot level, Richard's Incline Shaft.	XI	A burst of rock ...	Head and body crushed.
Do ...	Do ...	Do	Do ...	Compound fracture of left metacarpal bones, (tendons completely cut) wound of back.
Do ...	Do ...	Do	Do ...	Wound of left heel, hand, elbow, back and right hand.
Cooly ...	Tram line, Cyanide Works (Surface).	XXII	While turning a bandy on the turn table, another bandy came up from behind and struck his arm.	Collis fracture of left radius.
Hand Jumper Cooly.	Bottom stope, 1,450 foot level N., Ogle's Shaft.	XIX	A burst of quartz ...	Compound fracture of right fourth toe.
Tramming Cooly.	Tram line, quartz yard (Surface).	XXII	While tipping stuff on the grizzlies, a stone dropped on his hand.	Lacerated wound of left middle and ring fingers.
Cooly ...	Cyanide Works (Surface).	XXII	While packing the tram line, a bandy came along and struck him on the leg.	Lacerated wound of left leg.
Hand Jumper Cooly.	Bottom stope, 1,450 foot level S., Tenant's Shaft.	XIX	A burst of rock ...	Compound fracture of right middle finger and wounds of upper lip and chin; upper incisors knocked out.
Timber Mestri ... (M. 2,929).	30 feet below 1,450 foot plat, Taylor's Shaft.	VIII	When fixing a stage across the cage road, he slipped and fell down the shaft.	Serious injuries to body.
Electric Pump Fitter.	Pump Station, 2,450 foot level, Taylor's Shaft.	XVIII	While feeling the temperature of the bearings, his finger was caught between the cog wheels of the pump.	Compound fracture of left little finger.
Timber Cooly ...	South Cage Road, 200 feet from surface, Taylor's Shaft.	XI	While unfixing a piece of timber in the cage road, another cooly who was helping him struck him on the hand.	Compound fracture of left little finger.
Cotterman ...	Crosscut West, 3,175 foot level S., Ogle's Shaft.	XIX	A burst of rock ...	Serious injuries to body.
Mestri (M. 854—B. 182).	Bottom stope, 1,750 foot level N., Ogle's Shaft.	III	While bringing down loose, a shale of rock from the square end of the stope fell on his foot ...	Wound of left tendo-achilles, tendon completely cut.
Timber Cooly ...	Bottom stope, 1,750 foot level, Ogle's Shaft.	XIX	A burst of quartz ...	Compound fracture of skull and wound on neck.

RECORD OF FATAL AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
3rd November...	241	The Balaghat Gold Mine, Bowringpet Taluk, Kolar District—(concl'd.)	11-30	5½	...	1 Lal Khan ...	20
20th November...	258	Do ...	10	3	...	1 M. Rajoo ...	25
16th December ...	279	Do ...	1-30	3½	...	1 Coonji Ahmed...	26
14th April ...	69	The East Betrayaswami Mine, Bowringpet Taluk, Kolar District.	17	5	...	1 P. Ezekiel ...	19
6th June ...	112	Workington Iron and Steel, Co., Limited, Kumsi Sub-Taluk, Shinoga District.	12-30	3½	...	1 S. Gudia ...	25

AND SERIOUS ACCIDENTS

OF MYSORE DURING THE YEAR 1913—concluded.

Table 13—concluded.

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Tramming Cooly	Quartz Yard (Surface)	XXII	While tipping a bandy, it slipped back and ran over his foot.	Compound fracture of right first metatarsal bone and lacerated wound of right foot.
Timber Cooly ...	No. 2 Rise, 700 foot level N., Tennant's West Shaft.	XV	While climbing up the ladder in the rise, a stone from above fell on his head.	Compound fracture of skull.
Hand Jumper Cooly.	Bottom stope, 2,300 foot level, Ogle's Shaft.	XIX	While bringing down loose in the stope, a stone fell on his head.	Compound fracture of skull.
Time Keeper ...	Plat, 150 foot level, Main Shaft.	VIII	While measuring the depth of water in the sump he slipped and fell into it, a distance of about 23 feet.	Deep wounds of scalp and severe shock.
Mutty Wodder ...	Tram line (Surface)...	XXII	A bandy which he was pushing became derailed and struck his leg.	Fracture of right leg above the knee.

RECORD OF FATAL AND SERIOUS
ACCIDENTS.

—•—
[NON-MINING.]

RECORD OF FATAL AT MINES WORKING IN THE STATE

1	2	3	4	5	6	7	8
Date of Accident	Registered Number of Accident	Name and Situation of Mine	Time of Accident (counting hours from midnight)	Number of hours worked before Accident	Names and Number of Persons killed (All males unless otherwise stated)	Names and Number of Persons injured (All males unless otherwise stated)	Reputed Age
11th February ...	29	The Mysore Gold Mine, Bowringpet Taluk, Kolar District.	...	...	1 Maurimoothu ...	...	5
Unknown ...	55	Do ...	...	...	1 Jagatha (Female).	...	25
Unknown ...	86	Do ...	...	...	1 Krishtan ...	...	2
Unknown ...	132	Do ...	...	...	1 Chinnathambi ...	...	27
Unknown ...	182	Do ...	...	...	1 Narasammah (Female).	...	24
Unknown ...	266	Do ...	...	...	1 Chinnabidda (Female).	...	18
27th May ..	99	The Champion Reef Gold Mine, Bowringpet Taluk, Kolar District.	10-15	3	1 Perumaul ...	...	26
18th August ...	168	The Kolar Gold Field Electricity Department, Bowringpet Taluk, Kolar District.	9-30	2½	...	1 B. Thimmiah ...	31

AND SERIOUS ACCIDENTS—(NON-MINING).

OF MYSORE DURING THE YEAR 1913.

Table 13A.

(Supplementary.)

9	10	11	12	13
Occupation	Place of Accident	Class of Accident in terms of Table 7	Cause of Accident	Nature of Injury
Un-employed ...	Small tank adjoining big tank near the Post Office (Surface).	XXIII	Presumably fell into the tank and was drowned.	Drowned.
Un-employed ...	Tank near the Post Office (Surface).	XXIII	Suicide by drowning ...	Drowned.
Un-employed ...	Water Collecting Pit near Crocker's Compressor House (Surface).	XXIII	Presumably fell into the water in an epileptic fit and was drowned.	Drowned.
Timber Cooly ...	Unknown ...	...	Unknown ...	Traumatic tetanus. Died in hospital on 6th July.
Un-employed ...	Tank near the Post Office (Surface).	XXIII	Presumably fell into the tank and was drowned.	Drowned.
Un-employed ...	Tank near the Post Office (Surface).	XXIII	Unknown.	Drowned.
Skip Road Cooly.	Plat, 30 feet above 41st level, Glen Shaft.	VIII	While fighting with another man on a stage, he fell into the Shaft.	Wounds over right eye brow and left temple.
Machinist ...	Saw mill (Surface) ...	XX	While cutting a piece of wood, it jerked causing his hand to come in contact with the circular saw.	Wound of right thumb, joint completely opened.